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THIRD SERIES VOL 57 NUMBER 1 NOVEMBER 1949

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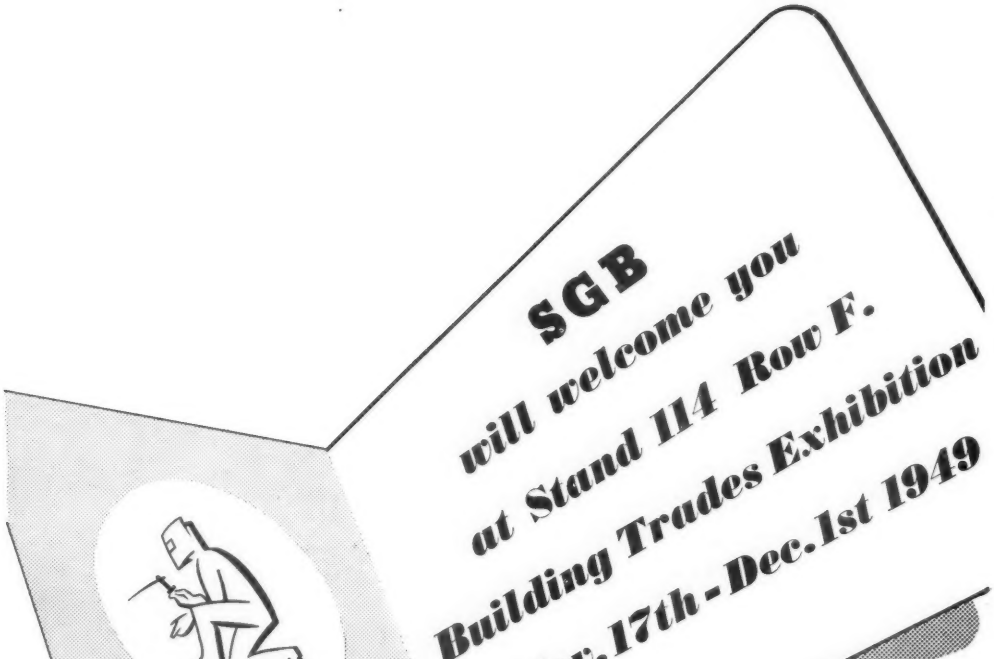
66 PORTLAND PLACE LONDON W1 · TWO SHILLINGS AND SIXPENCE

HOUSE IN BUSHEY HEATH.

From a drawing by R. Rosner, A.M.T.P.I. [A]



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THE JOURNAL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS

THIRD SERIES VOL 57 NUMBER 1 : NOVEMBER 1949 : 66 PORTLAND PLACE LONDON W1 : TWO SHILLINGS & SIXPENCE

1 EDITORIAL
3 THE INAUGURAL ADDRESS
8 THE 23RD BUILDING EXHIBITION AT OLYMPIA
9 THE WORK OF THE NORTHERN IRELAND HOUSING TRUST—E. L. BIRD
17 ECONOMY IN THE USE OF STEEL IN BUILDING—L. W. ELLIOTT
23 REVIEW OF CONSTRUCTION AND MATERIALS
24 SHORT CONCRETE PILES FOR FOUNDATIONS ON SHRINKABLE CLAYS—N. DAVEY
26 PRACTICE NOTES
27 BOOK REVIEWS
29 NOTES AND NOTICES
30 MEMBERSHIP LISTS
38 REVIEW OF FILMS—13
39 NOTES FROM THE MINUTES OF THE COUNCIL
40 MEMBERS' COLUMN

Christmas Holiday Lectures for Boys and Girls

'Pillars of the Past' is the title selected for the Christmas Holiday Lectures to be given this year by Mr. R. E. Enthoven, A.A.Dip. [*F*]. They will take place in the Henry Jarvis Hall of the R.I.B.A. at 3 p.m. on the following dates: Monday 2 January; Wednesday 4 January; Friday 6 January 1950, and will be fully illustrated by slides. There will be an opportunity for questions and discussion at the end of each lecture.

Mr. Enthoven proposes to show the way in which the classical tradition—which has influenced and enriched European culture during the past two thousand years—has been reflected in its architectural language; how the tradition spreading from Greece and Rome gradually influenced the design of buildings in other European countries, and that in spite of the impact of modern science and new methods, roots of Western European architecture may even today be traced to Greece and Rome.

Boys and girls who wish to attend any or all of the lectures should apply for tickets to the Secretary, R.I.B.A., 66 Portland Place, W.1, marking their envelopes 'Christmas Holiday Lectures' in the top left hand corner. Tickets are free, but as accommodation is limited application should not be made for more tickets than can be used. (Telephone enquiries to LANgham 5721, Ex. 18.)

The International Union of Architects

The Second Congress of the U.I.A. is to be held in Warsaw from 3 to 10 September 1950 on the general theme 'How the architect is facing up to his new tasks'. This will include a view of the reconstruction of destroyed towns, the remodelling of existing ones and the construction of new towns. It will also include discussions on civic centres and centres of districts, the dwelling, free space and the techniques of realization. The British Committee of the U.I.A. (Chairman, Mr. H. S. Goodhart-Rendel [*F*]) are arranging for papers dealing with the British contribution to the Congress.

The Congress is open to individual architects. It is felt, however, that some may hesitate to attend owing to currency and other restrictions. The President of the U.I.A., Sir Patrick Abercrombie, has given an assurance that the committee in Poland are most anxious to help as far as they can with hospitality. Architects who wish to attend the Congress are asked to notify the Secretary of the British Committee of the U.I.A. at 66 Portland Place, W.1, without delay so that the Polish Committee can be advised as to probable attendances and the British currency authorities given some idea of the total demand likely to be made.

Architectural Science Board Lectures

In December last year Mr. Richard Eve [*A*] gave an A.S.B. lecture on the first results of the heating trials being conducted by the Building Research Station. He was then a member of the staff of the Station and, with Dr. J. C. Weston, was in charge of the trials. The lecture was mainly devoted to giving the results in terms as simple as the complexity of the experiment allowed, and therefore Mr. Eve scarcely touched on the effect the results might have on house design.

On 13 December next Mr. Eve is to give another A.S.B. lecture, under the title 'Heating Research and House Design'; he is no longer on the staff of the B.R.S., but will carry the subject into more strictly architectural realms by explaining the design implications of the first year's results of the B.R.S. trials, looking at the matter through the eyes of an architect harassed by the day-to-day problems of erecting a building. The lecture will begin at the usual time, 6 p.m., preceded by a buffet.

Presentation of Diploma of Distinction in Town Planning

At the Inaugural Meeting on 1 November the President presented the Diploma of Distinction in Town Planning to Mr. Robert H. Matthew [*A*], Architect to the London County Council.

Before making the presentation, the President read the following citation of Mr. Matthew's qualifications for Distinction.

'Mr. Matthew commenced with academic studies in planning as Arthur Cates Prizeman in 1932, and as R.I.B.A. Alfred Bossom Gold Medallist in 1936. He was appointed Technical Officer responsible for planning in 1938 to the Scottish Planning Department.

'Appointed Deputy Chief Architect in charge of planning for Scotland, 1943, he became Chief Architect in 1944, with the task of building up an entirely new planning organization of central and regional planning officers, a research staff working on planning standards and technique on the planning of new towns, and of a central mapping and information bureau.

'Mr. Matthew was appointed Deputy Consultant to Professor Sir Patrick Abercrombie for the Clyde Valley Regional plan and was joint author of the plan and report.

'In 1946 he was appointed Architect and Planning Officer to the London County Council, and is now responsible for all aspects of planning work in the County of London, including the preparation of the Development plan under the 1947 Act, and the replanning of the Reconstruction Areas, one of which, in Poplar, will become part of the 1951 Exhibition.'

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New Honorary Associates R.I.B.A.

At their meeting on 1 November the Council decided to invite Mr. Thomas Downing Kendrick, F.B.A., F.S.A., Hon.D.Litt., Professor Thomas Bodkin, M.R.I.A., M.A., D.Litt., Dr. Frederick Measham Lea, O.B.E., D.Sc., F.R.I.C., and Mr. Ian Murray Leslie, J.P., to become Honorary Associates.

Mr. Kendrick has been Keeper of Antiquities at the British Museum since 1938. Professor Bodkin is Barber Professor of Fine Arts and Director of the Barber Institute, Birmingham University. He was Director of the National Gallery of Ireland from 1927 to 1935, is a member of numerous committees on museum organization and art education, and is the author of numerous books on art. He is Chairman of the Council of the Birmingham Civic Society. Dr. F. M. Lea is best known to architects as the present Director of Building Research. He is a graduate of Birmingham University, and in 1925 joined the staff of the Building Research Station, where he earned an international reputation as a cement chemist. He has been Director since 1946. Mr. Murray Leslie is Editor of THE BUILDER; last year he succeeded Mr. G. J. Howling [*Hon. A*] with whom he was Associate Editor for many years. Outside the circles of architectural journalism he has achieved a high reputation as a children's magistrate. As Chairman of the London Federation of Boys' Clubs he has played an important part in a movement which has been of peculiar interest to many leading architects.

The Scottish Laboratory of B.R.S. opened

A conference was held in Glasgow on 6 October to mark the establishment of the Scottish Laboratory of the Building Research Station at Thorntonhall, about seven miles from Glasgow. As Dr. F. M. Lea, Director of Building Research, said at the Conference, B.R.S. has long had close contacts with Scotland. Its work has included investigation of clays for brickmaking in N.E. Scotland and of limestones for lime manufacture. Foamed slag and no-fines concrete (the latter originated in Scotland before the war) have always had special reference to Scotland and there has been a long and fruitful association between B.R.S. and the Scottish Special Housing Association.

The laboratories at Thorntonhall, which are not yet complete, are being equipped mainly for work on basic materials such as cements, aggregates, concrete and concrete products, limes and slates and bricks. They will thus be of value in the development of Scottish raw materials for the manufacture of building materials. At the same time the Scottish laboratory, in building up a specialized local knowledge of building requirements, conditions and materials, will be of service to Scottish architects.

Mr. L. W. Hutson, O.B.E. [*F*], President of the Royal Incorporation of Architects in Scotland, welcoming the establishment of the Scottish B.R.S., said that the work undertaken now would determine the character of the Scottish environment for the next hundred years.

American Houses

The exhibition of American houses from 1607 to 1946 at the Building Centre is notable for its presentation rather than for its size or novelty. It tells a purely historical story with charm and simplicity, so that the visitor progresses from panel to panel as though he were turning the pages of a skilfully edited book. It has been produced for the Inter-American Office of the U.S. National Gallery of Art by LIFE MAGAZINE and the ARCHITECTURAL FORUM.

Until the Frank Lloyd Wright era, the United States owed its domestic design to imported influences. Even the Wild West log cabin came from Sweden. While these importations became modified somewhat by native materials, as with the Colonial timber version of English Georgian, only now is a truly indigenous American domestic architecture beginning to emerge.

A Silver Cup

The Council at their meeting on 11 October accepted the offer of a silver cup presented by Mr. H. F. Kendall, who is a Student, R.I.B.A. The cup was originally presented by the Architect's Club in 1847 to Mr. Joseph Kay, who was Treasurer of the Club and a well-known architect of the time. Mr. Joseph Kay was Mr. Kendall's great-great-grandfather.

The inscription on the cup is: 'To JOSEPH KAY ESQ., in grateful testimony of his valuable services AS THEIR TREASURER for a period of thirty Years. A friendly tribute to his great private Worth and to his professional Accomplishments AS AN ARCHITECT, 13 May 1847'.

Engraved on the base are the names of several eminent architects of the time, presumably either members of the Club Committee or subscribers to the presentation. They are: Sir Robert Smirke, R.A., H. H. Seward, Philip Hardwick, R.A., C. R. Cockerell, R.A., G. L. Taylor, W. C. Mylne, Decimus Burton, Charles Barry, R.A., John Shaw, Sydney Smirke, Samuel Angell, Thomas Allason, George Gutch, Samuel Beachcroft.

With the consent of the donor the cup is to be on permanent loan to the Council Dinner Club.

The School Building Programme

In a speech made on 26 October the Minister of Education outlined the action which the Ministry proposed to take regarding the making of economies in the schools building programme. He said there was no intention to depart from the broad policy of the 1944 Education Act, but that there were marginal savings which could be made to achieve the 10 per cent cut in expenditure on the 1950 building programme which had to be undertaken. Many schools were still costing too much. For example, in five cases of schemes submitted to the Ministry, taken at random, cuts of from 10 to 17 per cent in the area of buildings, amounting to £15 to £35 per place had been made in consultation with the Ministry's architects. The present Building Regulations were too generous in many respects; he had decided some time ago to amend them, and he hoped to publish new regulations early in the New Year which would give detailed recommendations on planning and construction. These new regulations would not materially affect the 1950 programme. At present, work on the site amounted to £47 million, and there was about another £8 million worth of work which had received all approvals.

R.I.B.A. Diary

TUESDAY 13 DECEMBER 6 P.M. A.S.B. Lecture. *Heating Research and House Design*. Richard Eve, B.Arch. [*A*].

MONDAY 2 JANUARY, WEDNESDAY 4 JANUARY, FRIDAY 6 JANUARY at 3 P.M. each day. Christmas Holiday Lectures for Children. R. E. Enthoven, A.A.Dip. [*F*] *Pillars of the Past*.

TUESDAY 3 JANUARY 6 P.M. Announcement of Award of Prizes and Studentships. *Concert Halls*. Hope Bagenal, D C.M. [*F*].

The Inaugural Address

By the President

Mr. Michael T. Waterhouse, M.C.

Read before the Royal Institute of British Architects on Tuesday 1 November 1949

THIS MEETING is entitled the Inaugural Meeting of the Session. It is for the Royal Institute, and for myself, the first general meeting of my second year of office as President. For me, however, it has an even wider meaning. It is the first major occasion on which I am able to speak of my experience with the British Building Industry Productivity Team during our mission to the United States.

You will realize, if you have not already done so, that during those unforgettable eight weeks I became infected with a germ —a germ for which I have a particular affection—the germ of enthusiasm. Enthusiasm —and particularly enthusiasm for work—is one of the dominant features of American life. This is my first opportunity to endeavour to disseminate and to pass on that infection while I am still braced by the tonic effect of six weeks of life in a country, the atmosphere of whose human outlook is vitally affected by the fact that the vast majority of these individual units are all seeking for, or intensely desirous of retaining, individual freedom. Before I come to that however I must give a brief outline of our team, our tour and its objectives.

The team was composed, as many of you know, of six employers, one of them the leader of our team, six operatives, or as I prefer to call them craftsmen, two quantity surveyors, two architects and one invaluable secretary. Among the employers, or builders, were represented, from all parts of the country, all branches of contractors including sub-contractors. The operatives, besides representing the major crafts, had been selected as prominent in their local union branches and had with them the Industrial Adviser to the National Federation of Building Trades Operatives. Our two quantity surveyors had, at first, I know, misgivings about their inclusion in the team because their profession, as such, does not exist in the States. I can only say that without the untiring work of this indefatigable pair we should have been very much at a loss in the matter of costing comparisons, one of the most essential features of our work.

We architects, Robert Matthew and myself, were chosen, one from the public or official services, the other a survival of free enterprise. Here for a moment I must say a word of our leader Robert Owen Lloyd. It is this, that the industry, however far it searched, could not have found a better man for the job and that he surpassed himself in the doing of it.

Of the tour itself you will read in our report when it is published. It was deliberately confined to the north eastern triangle of the country as being the most representative and offering, by itself, a field more than adequate for the time. The report will show the organization of our work on both sides of the Atlantic and the methods of its achievement. There is one feature, however, to which tribute must now be paid. A team of this nature which had never met together until a few hours before stepping on the boat train, and which were to achieve an objective such as ours, could only do so by being firmly bound together by an intense and conscious dedication of themselves to the deepest interests of the industry, and a deep and individual sense of loyalty to the purpose of the mission. Not only our leader but the whole industry has a right to be proud that this spirit pervaded the entire tour and prevailed over any tendency to sectionalism.

My talk this evening is confined to my own impressions of America, and I am purposely avoiding much of the preliminaries of our visit, the history of its organization, or reference to places or persons. There is, however, one other essential aspect that must be touched on here before I come to our objective because the two are so closely interwoven.

I refer, of course, to the organization known as the Economic Co-operation Administration—E.C.A. This organization has one objective only—to put Western Europe on its feet again to the mutual advantage both of Europe and of America itself. They are the sponsors of the whole idea, not only of our team, but of the four previous productivity teams that had crossed the Atlantic, and those that will cross. E.C.A. is in my mind linked indissolubly with the dynamic personality of that inspiring character Paul Hoffman whom we had the interest and pleasure of meeting in Washington. Our immediate contact with E.C.A. was its extremely able Field Director Bill Kimbel. The amount that we owe to his capable energy and guidance it would be difficult to express.

The administration of E.C.A. in industry is undertaken by the Anglo-American Council on Productivity, a joint body of representatives of management and labour from both countries. The personality that I connect with this body is Mr. Philip D. Reed, its Joint Chairman. It was his invigorating and delightful speech at our initial meeting on U.S.A. soil that first opened my eyes to those three features that are the fundamental basis not only of American industry but of the whole of the American character and outlook on life. Competition, freedom for the individual to exercise his own judgment, enthusiasm of the individual to use his own ability to the best advantage. It was the advice given at this first meeting that helped us to view many of the things we saw and heard in their true perspective.

Our objective, given to us by our sponsors, was to draw such conclusions from a comparison between American and British constructional practice, after examination of their organization, technique and general outlook, as might increase productivity in this country, or conversely be mutually helpful to either nation You will appreciate that I can not at this stage forestall any conclusions that still remain to be arrived at, or agreed by our team in its final report. Nor do I wish to embark on any questions which may be controversial among the team, or may provoke controversy from outside on matters which are still under discussion by us. All that I say tonight will be either within the scope of our original statement agreed and issued on our return, or it will be purely personal observations on what I myself saw and felt. Conclusions will not and can not be drawn by me. These must await our report.

You should know at the outset how greatly impressed I have been by the report of the first productivity team recently issued, that of the Steel Founding Industry. Many of their observations and reflections on that industry are so intimately applicable to American industry as a whole and give such an insight into the general American outlook on industry that you will find actual words from their report in my address tonight.

Before going to the U.S.A. one is usually told 'You will find everything very different there'. Either to accept this as a truism, or to neglect it, as one is apt to neglect a warning, is the greatest danger to any true appreciation of the country and the people. It is the greatest mistake and the greatest

hindrance to the enjoyment by a visitor of this great-hearted people to imagine that they either think, or act, or react to life, conditions and surroundings, as do we British. *Everything* is different. How great and fundamental are those differences an observer can only begin to appreciate, even after intensive study, in so short a time. Politics, even religion in many ways, but above all the general outlook on life, all that goes to make life, even what goes to make life worth living—all are different. I have not the time to elaborate this theme though it is a fascinating one to pursue. I would, however, like to connect this thought with that enthusiasm for life and work of which I first spoke.

In my observation the philosophy of life of the American in his outlook towards work is extremely direct and simple. Like so many of their other outlooks it is so practical and commonsense as hardly to merit the name philosophy—rather is it part of his normal make-up. He is determined to enjoy life to the full. He knows that to achieve this he must give of his best towards it if he is to get the most out of it. He must have money if he is to get anything out of it. To have money he must work and, in a country of keen competition, must work hard. True therefore to his determination to enjoy life he enjoys work and enjoys it not only for what he gets out of it but also for its own sake with the delight and satisfaction that comes of doing a job to the best of his ability. This spirit I found to permeate all ranks and strata of society.

To turn to the differences between us as they affect building. The first and greatest is that of climate and its effect on the standards both of comfort and of necessities. The Americans, away from home are either extremely deceptive as to their home conditions or, more likely, they expect everyone else to know what they know about their own country and its climate. The Englishman until he goes there does not realize that the temperature for five months of the year is arctic and for another five tropical and that normal conditions as he knows them only exist for two months! In summer the rich, the luxury buildings and the larger shops and offices overcome this by air conditioning. The others, by thorough ventilation and insulated construction tolerate the heat with modified discomfort. In winter all *must* be warm. This means that every house however small or cheap must be heated throughout. In this respect what to us is a luxury is to them a necessity. Hence their ingenuity in small, economical and trouble-free heating installations. Hence too the contrast between their homes that are warm all through instead of our overheated living rooms with chilly corridors and cold bedrooms, each containing a fireplace seldom used. One effect of the heating necessity is the almost universal provision of a basement, and one of the most remarkable features of small house planning is the ingenious way in which this is used not only as a cool place in summer and a warm place in winter and also to take the place of all outbuildings and serve as utility room, washhouse, store, but further, it is used to secure extreme simplicity and economy in planning and cost of plumbing, heating, hot water supply, electric services and drains.

Another feature of extreme divergence between the British and American outlook is that on permanence of structure. To them a house 20 years old is *old*; that is to say it is old-fashioned—old-fashioned means out of date. Out of date to them means that it would be better out of the way. This feeling which is obvious in all small house building methods applies with almost equal force in the larger and more solidly built houses and even to office buildings and stores. One can see it in process in the cities where well-built areas of a generation ago have today become apartment slums already being destroyed, and office buildings that we should consider serviceable are in course of demolition and rebuilding. I must remark, however, that I could not hear of a skyscraper having been demolished presumably because the cost of demolition added to rebuilding could not be financially justified.

With the foregoing in mind it will be appreciated how difficult it is to make any true comparison between the countries. There can be no comparison of value house against house and with our idea of permanency, a very difficult comparison of the value given for the money expended. This difficulty is not so great in the more permanent, and to our eyes more normal types of structure—offices, apartment houses, factories, shops and the costings examined and summarized during our visit embraced all classes of buildings.

It will be recalled that in the official Press statement issued on our return we summarized our conclusions on the overall cost of building in the U.S.A. as compared with this country, and commented on the various incentives which resulted in higher productivity by the individual there, whatever his position in the industry. This higher productivity—a word which has been well defined as 'the ratio of the production of wealth (goods, services, human satisfaction) to human effort expendable'—was the kernel of our objective.

As we pointed out in our Press statement it is not true that the American building operative works at 50 per cent greater speed, or puts into his work that increase of effort. Nor indeed would this 50 per cent figure alone account for the difference between the ratios of building cost to wages in the two countries. The secret of American productivity lies in many other factors. Chief among them, I think, is 'productivity consciousness' and the fact that, there, the building industry has this objective just as firmly in mind as does any other simpler or 'factory' industry. It was said by the Steel Founders team of their industry that: 'First, last and all the time managements are actuated by the belief that high rates of production are essential to individual and collective success. Workers at the bench, at the machine, and at the office, subscribe to this belief. This belief is not simply intellectual appreciation: it has a firm emotional hold upon the whole body of American industrial thought'. With this statement I most heartily agree and to my mind it is in this factor that lies one of the major differences between our two nations.

This spirit has for long actuated employers and employees in the American building industry and in the architectural and engineering professions. The practical application of it in the building industry, as I see it, has been that employers have realized that as the building operative on the job is almost, if not quite, the highest paid artisan in the U.S.A., reduction of cost can only be attained by reduction of job man-hours to a minimum, and seeing to it that each of those job man-hours produces maximum result. Shop hour rates are cheaper and 'shop-production' gives greater volume of output per man-hour.

The result is a carefully thought-out 'production line' technique applied as far as possible throughout the industry. It is this 'factory mindedness' that results in so much of the work on the job consisting of the assembly of ready-made—factory-made—call them prefabricated, if you like—units, rather than the making of *things* on the job. It is true, of course, that this applies to the sub-trades and fitters work more than to heavy work. But once this factor has been observed and notice taken of it in visiting sites, it is remarkable how often its effect can be observed.

For example, in one of the latest skyscrapers now being erected, 100 Park Avenue, New York, the outer walls are sheets of insulated aluminium alloy, of the largest size that can be handled, which fit into vertical mullions running the full height of the building. These sheets alternate with aluminium windows fitting into the same mullions. The whole is a 'wall-sheet and window' assembly job.

The application of this technique of carpentry, joinery, plumbing, heating, hot water supply, or electrical work I will leave to our report where it will be dealt with in detail.

You may say that this spirit tends to the elimination of, and is the negation of craftsmanship. In many ways this is true. You can observe on all sides much work which to our eyes is below standard. Here again we are up against the difference of national outlook. If a thing is good enough for its job, or as good as you can expect for the price, what more does the American expect? With us it is a proverb 'good enough is no good' to them it's 'just the very thing you want'—a perfect example of difference of basic concept of idea. To their mind swift assembly, quick production, adequate performance, are of themselves a form of craftsmanship. At the same time one can see in many places in masonry—in decorative work—in all sorts of materials—marble, stone, wood, metal, glass, terrazzo, plaster—examples of fine craftsmanship of which any nation can be proud. They *can* do it where and when it is wanted.

The production line spirit naturally leads me to speak of mechanization. This is a

subject too technical for this evening. I will only leave with you one thought based on a dictum of a Buffalo architect. It is this: 'We Americans are the laziest nation upon earth. We invent machines to do for us anything we do not want to do for ourselves or anything we don't want to pay anyone else to do. The result is we get more done than any other people in the world and employ more people.'

Any thoughts on American productivity lead us naturally to the feature which is described in the Steel Founders Report as being the 'governing factor in American industry' namely, competition. This is indeed true and as true of the building industry as any other branch. This point was stressed in our first statement and it can not be too strongly emphasized that it is the basis and key-note of that invigorating tempo of life so characteristic of the U.S.A.

You may say that, in our industry at home, competition exists both in the tendering for jobs, in the effort to keep down costs on the job, and in the spirit of trying to give best value so as to keep a valuable reputation once gained; and that this applies equally to our profession. True—but these are very minor matters compared with the utter competitiveness of every walk of life and every outlook upon it that pervades the spirit of life over there. This spirit is not mere commercial competitiveness. It is rather a natural resultant expression of that self-conscious individualism which is so characteristic a feature of their code of living. I will not continue this theme nor enter into the deep question of the incentive effect of competition on both operative and employer, for fear lest I should encroach on one of the prime matters of our coming report.

There are, however, two sidelights that I can not refrain from remarking upon. The first I draw from an American writer who points out that they do not desire to make money for its own sake but for its effect upon their standard of living and comfort and the position thus secured, and the opportunities of improving these. One result of this is to eliminate any streak of meanness in the making or the spending of money. The second, from my own observation, is the way in which the spirit of co-operation and team work can be and is intensified by this competitiveness.

Each man working for a contractor knows that he has to give his best if he is to keep his job. If he can't, some other guy will get his job. But he also realizes that it is only by this means that his boss can do the job in time and make it pay. He wants his boss to succeed and, apart from any material benefit to himself, he takes a pride not only in his own gang doing its best to make the job pay, but he also takes a personal pride in his firm's success. A remark typical of this was made to me by one operative. 'Why, I wouldn't work for a bum firm. I'd sooner see them out of business'. This illustrates also that keen outlook by which the test of efficiency is applied from below as well as from above.

A natural, but at the same time very noticeable feature, resulting from this 'competitive-mindedness' is the remarkable development of the art of salesmanship. And a very high art it is, as well as an all-pervading one. To live one must succeed. To succeed one must sell one's goods. To sell one's goods they have got to be made to attract the purchaser. But in all professions and indeed in all walks of life there is something more than mere articles to sell. A man must put over his own personality —his ability—his skill. It is only thus that he can swim freely in the sea of competition instead of treading water—floating, or sinking.

Another feature which makes the task of the salesman easier is what I would call their 'new mindedness' or spirit of experiment. It is all a part of that difference of outlook on permanence of which we spoke before. It is almost true to say that they are so accustomed to improvements, and to the fact that most of their changes are improvements, that they instinctively think that if a thing is new it must be good. One interaction of this on their lives is an almost complete lack of compunction against change of any type. Change of employer, change of job, change of place, change of occupation. Almost a negation of all those things which to us forge the links that form the chain of tradition.

You may wonder when I am coming from generalizations or characteristics to greater particulars as to my own profession. There is much to say on this, so much in fact that I leave the particulars to another occasion. But what I have said, and shall say tonight, is an essential background to the whole aspect of professional relationship with the client, the allied professions and the contractors.

On general matters, I would first remark on the standing of the profession in the eyes both of the public (that is to say clients and potential clients) and the industry. In the eyes of both they have—and must have individually if they are to survive—a reputation for keen business efficiency and complete 'know how' of their job. Their salesmanship of this is good and is backed by results. I would say that their advice and opinion is regarded more as we accept the advice and opinion of a first class medical or surgical consultant—as without question the best professional advice available.

The fallacy so common to the British lay client's mind that because he lives in a house he must know all about it, including how to build it, does not obtrude itself there. The client there adopts the attitude: 'It's the architect fellow's job to know his job and to advise me how best to spend my money.' The architect's attitude: 'This client chose me to do this job because he thought I could do it best. If he doesn't accept my ideas and advice let him find another architect.' You may consider that I exaggerate if I say this is universal but I assure you that it is the dominant attitude and I would remind you of the characteristic art of salesmanship. That being the attitude on design and artistic merit, the quality of business efficiency either proves itself, both to the client and contractor, in the course of the work or the reverse. Should it fail, so does the architect.

They have in many ways followed the technique of the building industry in the trend towards simplification with the objective of unit assembly to secure the benefits of shop work, or prefabrication, or repetition of units, towards economic building. They show remarkable ingenuity in diversity of assembly of such units to dissemble the monotony of exact repetition, and to develop the artistic conception of a flexible architecture of interchangeable parts.

One of the major differences between the two countries is, of course, the fact that the quantity surveyor does not exist as a separate profession, consequently there are no bills of quantities to form the basis of the contractor's tender The contractor must have full information on which to tender, or as they say, 'bid' This in the absence of quantities can only be supplied by drawings, fully finalized, and complete in every respect, and supported by a specification, both prepared in accordance with the standard practice of the American Institute of Architects, by the architect in conjunction with the structural and mechanical engineer. It is impossible to emphasize too strongly the fourfold effect that this practice has. It means that at the time of bidding the main contractor has the job before him complete in every detail; that all sub-contracts are let at the same time as the main tender; that contractor and sub-contractors can not only agree and arrange the inter-relation of their works and plan their programme and timing accordingly, but also that they can order ahead all their materials. And finally it acts as a most formidable deterrent to the productivity-conscious client, or indeed to his architect, to prevent either changing his mind during the progress of the work.

It is little exaggeration, I consider, to say that almost 50 per cent of American superiority in productivity is due to pre-planning and careful organization before site work begins, and that the majority of this pre-planning is made possible only by the completeness of information at bidding stage, and the fact that the contractor does not have to wait for information on any point during the course of the works.

The matter of the quantity surveyor I must leave to our final report. I can only say that the advantages of our system of independent quantities have been advocated by many Americans; that the system was run by a large firm for about 20 years but that the firm did not survive. Finally, whereas I said that the fact that there were no quantities made it incumbent on the architect to complete all drawings before bidding stage, this does not need to be taken as a reflection either on our quantity surveyors or on their system.

There is every reason why the British architect should be sufficiently conscious of the benefits of pre-planning to secure that all drawings are available at the same time as the bills and that all sub-contracts are

lettable at the same time. It is incontestable of course that, under present conditions, America has the resources to enable the building industry to take full advantage of pre-planning and organization; that the chief factors that make for these advantages are, freedom of choice of supply of material—abundance of suitable material—and a competitive labour market.

Incontestable too that these advantages are denied to us by the economic situation. At the same time, however, we have other obstacles that could be overcome, restrictive limitations that could be eliminated, improvements that could be made towards the aim of allowing some of the benefits of pre-planning to take effect. Although I said I would not forestall our report I can not help hinting at them here in case they do not appear there in full force. We architects often hear from contractors the complaint that the job is begun before our drawings are finished or sub-contracts essential to the programme are predetermined. True—alas *too* true, and too often true. But this can never be the desire of a good architect, seldom the wish of any architect, and I would say seldom really his own fault.

We badger our clients to make up their minds so that we can finish our drawings, a task that is frequently impossible for them even if they know definitely what they would like to have. An industrial client, for example, may be unable to obtain from his plant suppliers precise information and details which ought perhaps to be incorporated in floor or foundation drawings by the architect and engineer.

But apart from special examples of this type there is one dominating difficulty—I might almost call it a major restrictive practice. It is one that I suggest could be swept away very quickly by any government that was either productivity-conscious or economy-minded—or better still both.

In contrast with the simple procedure of the U.S.A., which normally requires only conformity with published codes, regulations or standards, all our plans and drawings for any building project have to be submitted to a galaxy of ministries, departments or authorities, local or otherwise, for approval. Each in its sphere feels in duty bound, either because of its own importance, its special knowledge, or to satisfy the sense of efficiency of its own officials, to compel or at least forcibly suggest some alteration. These alterations are frequently unacceptable to one of the others, and perhaps overlap the sphere of another. Town and Country Planning, Health, Education, Supply, Board of Trade, Labour, Distribution of Industry, Local Authorities, to mention some. All and each have their greater or lesser whack, either at the principle, or the actual planning, or appearance of the scheme. Last, if not before, comes Ministry of Works and licensing. All is under the shadow of the Central Land Board, the gloom of the development charge and its depressing effect upon enterprise, whether public or private.

No conscientious architect can advise his client, however bottomless his purse, to instruct him to prepare complete working drawings, specification, and bills of quantities, for a project in the hope that it will pass intact, unaltered, unsinged through all these infernal fires, to receive the crown of licence on its virgin brow, with the accompanying instruction that 'work must be commenced within two months'. Of course not. We submit, in our client's interests, the minimum to pass this inquisition and when that minimum emerges months later—perhaps a shadow of its original self, perhaps even unrecognizable, we have to start work on site in two months on pain of forfeiting our licence or missing our steel allocation for the period!

No wonder that apart from the client's natural impatience at the months of frustration and delay, our working drawings under these conditions can hardly ever be complete before work begins. No wonder that full bills of quantities are supplanted by a schedule of prices, approximate quantities, and a mass of P.C. items and provisional sums.

If only all the various ministries and other bodies who have to approve projects (and feel they must alter something in each) could be replaced by one central determining body imbued with the power and desire to act and determine quickly. Imagine all the man-power of skilled men in our profession who could be released to do positive creative, instead of negative, work. Imagine the impetus to building both direct and indirect by the elimination of all this delay and uncertainty. But apart from this, and above such matters, important as they are, it is realized by many thinking persons that the building industry, entering as it does into every phase of life, domestic, cultural, industrial and commercial, is fundamental in the economic recovery of the nation. We were sent to the U.S.A. to see if we could find anything that would help our industry in this vital task.

I adhere to my promise not to forestall either our report or our conclusions. I do, however, feel free to put to you a basic question that was put by the Steel Founders in their report and to leave you to ponder your own reactions to that question as it relates to our industry.

The question is this. Is high productivity really desired by the British building industry? There is much to reflect on and remember before giving the answer. Think of the difference of outlook in such matters as permanence or impermanence; tradition, or mere adequacy for purpose; craftsmanship on the job, or shop assembly.

The Steel Founders say bluntly of their own industry that according to the Economic Survey, there is only one alternative to high productivity—starvation. We must ask ourselves is that true either of our industry, or of its effect on the national life? If true, to what extent must we change our methods? Would that necessitate a complete change of outlook? If so do we want to? Must we? Can we?

What I have said this evening has been an attempt to put before you as I saw them some of those differences between the two nations which are deep at the root of the choice that has to be made in the answer to these questions. Each one must answer for himself. For myself, you know me for what I am, a product of a tradition which I respect as the foundation of my life and work. At the same time I am a staunch believer in individualism, and freedom both in life and in work. Work is to all of us the mainspring of life and I return from this visit refreshed by the vision I there saw of opportunities for freedom therein.

For myself, and for my fellow countrymen, I desire the best of both these worlds; secure in the conviction that individual effort alone can give the impetus to united work for the common good and that if all work together to this end it can not be denied us.

VOTE OF THANKS

The Right Hon. Charles W. Key, M.P., Minister of Works: All of us here this evening owe a debt of gratitude to the President for his address, and for the preview which he has given us of the report of the Building Mission to the United States.

What has struck me most forcibly is not only the informative content of that address, but also its very attractive presentation. That which the President has told us of the experience of members of the mission provides confirmation that the building industry took the right course in deciding to accept the opportunity of sending a team to the United States to study building practice and productivity in that great country. It is not really surprising that the building industry in this country took that decision, for, in my experience of it, I am quite convinced that it can be relied upon to respond to the calls which are made upon it to unite, as it has done in this instance, in a joint endeavour to study at first hand how the problem of productivity is tackled in the United States.

It was very significant and, I think, very gratifying that the mission included representatives of the professions, as well as representatives of employers and operatives. The building industry is made up of many parts, but all are concerned with the final result, and all can make a contribution to the improvement of efficiency and the reduction of costs.

I am very glad indeed that this Institute was ready to join the mission and that it recognized the great importance of that mission by appointing its President as a member, and we are greatly indebted to him for giving, in such a busy year, so much of his energy and time to it.

The work of the mission is complementary to that of the Working Party on Building Operatives whose activities provide another example of the co-operation of all sections of the industry—professions, employers and operatives—in undertaking a comprehensive investigation into the organization of building operations in this country. We are looking forward with lively interest to the reports of these two

expert and representative bodies, the Productivity Team and the Working Party.

In the early post-war years emphasis was placed upon production, and it was, of course, right that in the conditions then obtaining, with acute shortages of materials, labour and plant, we should seek in maximum production the answer to our problems. Notable progress has been made in raising production in building as in other industries, and I have myself, on a number of occasions, paid tribute to the achievements of the industry.

Today the emphasis is on greater productivity, that is to say, on increased output per man-hour. We may—indeed, we must—be ready to face reductions in capital investment on constructional work, but the circumstances which make those reductions inevitable justify more and not less productivity. As a country we must get our export prices down to a point which enables us to improve our position in the export market. Costs must be cut down by increasing efficiency, and this applies with equal force to the building industry whose products are a first charge on all industry; whether it is the building of new factories, power stations or the repair and maintenance of industrial premises, building costs are an important element in the cost of other industries.

This need for increased productivity and lower costs is one which the building industry must make its own particular responsibility. Each stage of the progress of the project, the preparation of the plans in the architect's office, the placing of the contract, organizing methods of working on the site and the work of the operatives, affords fresh opportunities to improve efficiency and reduce costs. I can not emphasize too strongly the paramount importance today of maximum efficiency combined with the lowest possible costs. On the success of our industries in reaching those objectives depends our survival as a nation, and it is because of that great importance to be attached to it that we owe so much to those members of this team who visited the United States, and who no doubt all found the building industry in the United States firmly convinced of the paramount importance of those two essentials.

I am certain that out of their report, and out of the advice and assistance which the individual members of the team can give us, not only the building industry but the general social welfare of the people of this country are going to reap very great benefit. It is for that reason that I say, as one of His Majesty's Ministers, we are very grateful indeed to the President, not only for the address which he has given us this evening, but for the energy and time that he has devoted to this investigation.

I have very great pleasure indeed in moving a very hearty vote of thanks to Mr. Michael Waterhouse for the address which he has given us.

Mr. **R. O. Lloyd,** O.B.E.: It is indeed a pleasure to say a word about Michael Waterhouse, the man who came with us to the United States to carry out this investigation. I am sure that we were all charmed with that beautiful picture of the part of America in which we travelled, and the delightful people with whom we came into contact.

I would also remind you of those solemn warnings which the President gave us towards the end of his address which typify the building industry sailing in shallow and reedy waters. All these controls and restrictions—many of them may be necessary—are not sufficient to allow the ship of the building industry to plough through deep water and to make a clean voyage. We sincerely trust that when the report is written and the talking is done action will commence.

We in this industry are deeply concerned with building costs today, and we are ever ready to advise His Majesty's Ministers and those in responsible positions as to what may be done to help, but one thing which is in the minds of every member of this industry is that the incentive should be sufficient to inspire the effort. In that respect the President of the Royal Institute of British Architects has this evening endeared himself a great deal more to the team for the very great contribution which he has made in his most enlightening address.

We thank the Royal Institute very sincerely for having given us not only Michael Waterhouse to serve on the team, but also Robert Matthew. You gave us two great technicians who became 'Bob' and 'Michael' as soon as the ship left these shores, and it was in that sense that the team was successful in working together, analyzing in a very uncomfortable climate, how the American building industry can and do produce buildings worth while at an economic price. We want in this country to be able to produce homes for our people without any form of assistance from the taxpayer. I am sure that before long, with some assistance and guidance from the American way of life and production, we shall be able to make a small but important contribution in the coming months to bring down costs in this country so that we can regain and rebuild our national economy. Let us hope that the day may not be far distant when we can say to the Americans: 'Thank you for your assistance through Marshall Aid. We can now sail our own boat and make our own contribution in the areas of the English-speaking peoples of our Empire, and also to the nations of the world.'

Mr. Minister, I have the greatest pleasure in seconding your proposition that a hearty vote of thanks be accorded to the President of the Royal Institute of British Architects.

Mr. T. C. Hill, F.R.I.C.S.: It is a great privilege to me to be invited to attend this meeting and to hear the most inspiring address which we have had from the President of the Royal Institute. I am very grateful for that privilege. You have only had to listen to his address to get some idea of what the team owes to Mr. Waterhouse, who was most ably seconded by the other architect member of the team, Mr. Matthew. A lot of the advantage of the team would have been lost if we had not had two such very fine representatives of their profession, and I have very much pleasure in supporting the vote of thanks to Mr. Michael Waterhouse. I might add that I was very much impressed in the United States, when we met other architects, with the high regard in which they hold the Royal Institute.

Mr. W. R. Cowen (President, The Federation of Associations of Specialists and Sub-Contractors): I also appreciate the very great honour in being allowed to associate my name with this vote of thanks to your President. His speech was typical of the man as we knew him in the United States. Mr. Waterhouse was a great man among us, and he has already conveyed to you, I have no doubt, some little idea of what we anticipate we shall be able to put forward in our report on a particular part with which he is concerned.

Mr. C. Gordon Rowlands, M.A. (Secretary, the National Federation of Building Trades Employers): As secretary of the team which went to America, I feel in the position of the Speaker of the House of Commons in the reign of Charles I, who told the king that he had no eyes to see and no words to utter except those which the House gave him! As secretary I was engaged in the task of compiling this report from the vast amount of information and evidence which we collected, and I certainly have no words to say about America, except those of a more personal and intimate nature this evening.

Although we only covered one small portion of the United States, we do feel that we got a pretty comprehensive view of what the President has described to you tonight as the attitude of the American business man, architect, contractor and operative towards their activities. I think that every one hundred per cent American—and if you go back only one generation you will probably find that he is one hundred per cent Polish or one hundred per cent Italian, or some other nationality—seemed to be imbued with the same feeling.

I understand that this is the first time in history that the President of this Institute has crossed the Atlantic during his term of office, and that fact was appreciated by the Americans. It is also possibly the first time that he has lived for such a long time in such close contact with a number of average building contractors and building trade operatives!

It has been a great privilege not only to have accompanied the team to the United States, but also to listen to the address which the President has given us tonight.

Mr. Robert H. Matthew [*A*] (Architect to the London County Council): It has been a particular pleasure for me to listen to the President's brilliant address this evening. His wise and serious comments on what, after all, has been an unprecedented occasion are exactly those which I should have expected him to make after a very

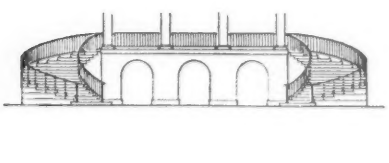
close association with him for just about two months. I should like to pay tribute, apart altogether from his work as part of the team, to the very delightful and dignified way in which he carried his banner—or should I say his chain of office—throughout the cities in the States, and to the various meetings of the A.I.A. where his presence, I can testify, was extremely well appreciated.

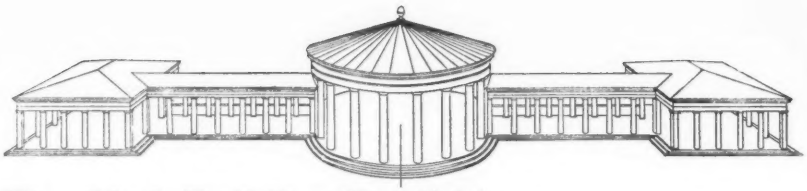
It was, of course, a great privilege to me personally to take part in this team, and I should like to take this opportunity in the name of the team to pay tribute to Mr. Lloyd, who has spoken this evening, for having carried the team from beginning to end.

I find that this experience has been difficult to assimilate; so much was concentrated in such a short time that a considerable period is necessary for reflection and digestion. One thing, however, which I think we have all appreciated is the very much greater knowledge which we have gained as a team of our own industry. By continually comparing conditions in the States with those at home as we knew them —and practically all interests were represented in the team—light was shed on our own conditions today which I, for one, could never have seen in any other way. This is, after all, a transient thing, but I feel sure that all members of the team felt a spirit—and the President has spoken of it—behind American industry of easy association between the various members of the American building industry which we do not get here at the present time. Anything we can do to foster that interest I think can do nothing but good, and I should like to see some steps taken by which a permanent association for study was instituted, away from the day-to-day work, between operatives, contractors, engineers, architects and surveyors. I think that nothing but good could come from such a permanent association.

I am very glad indeed to associate myself with this vote of thanks, and I hope that the members of this Institute, after the report is published, will have a further opportunity of hearing their President on the same subject.

The President: May I say, Mr. Minister, how particularly grateful we are to you for the honour of your company here tonight, and also for what you have said both about our team, and about the building industry as a whole in the present time of crisis and difficulty. I do thank you most sincerely, Mr. Minister, for your kind vote of thanks, but above all I thank the other members of the team for their pleasant and happy companionship and for all that they have given to the industry.





The 23rd Building Exhibition

At Olympia 17 November—1 December 1949

THE BUILDING EXHIBITION opened its doors at Olympia on the 17th of this month and will close them on 1 December. At the opening of the 1913 Exhibition Mr. Greville Montgomery was quoted as saying to the guests, 'You will find in the exhibition material that will build the ideal £110 house of the Local Government Board, or material with which you can equip a new palace for the King.' Ideals cost more in these days, but still they are ideals, and advance pamphlets indicate that at this year's exhibition we shall be able to study materials and appliances that will go far towards the realization of architectural dreams, assuming that one is allowed to use them.

Opportunities for incorporating materials and appliances depend on permission to build, and here the architect is in the hands of the Ministries; it is therefore encouraging to note that they are not holding aloof in god-like isolation, but are coming down to take their part in the labours and anxieties that are now a part of building; the Ministries of Agriculture and Fisheries, of Fuel and Power, of Health, of Labour and National Service, of Town and Country Planning, and of Works, each has its own stand, and we know from experience that the representatives will answer questions and give advice with a courtesy and enthusiasm that should go far towards easing the burden of a harassed architect.

A question much in our minds today is that of productivity, and how to increase it; the Ministry of Works exhibit should therefore be of interest, as it illustrates various recording systems for the costing of building work and for programme and progress sheets; these show how improvements can be made in the organization of the job, be it large or small. Economy in the use of steel is also dealt with, as well as the use of prestressed concrete.

The Ministry of Health display photographs illustrating the latest results of the attention now being given to the design and grouping of mixed forms of development. A model shows the outcome of research by the Ministry into the lay-out problems of a new residential area; while another model gives an example of the way in which a varied and economical lay-out can be achieved in a high-density development at 100 habitable rooms per acre.

With the Ministries so well represented we should be conscious of something missing if the D.S.I.R. were not represented also, but the Department is there, and we shall be able to greet our old friends the Building Research Station, the Forest Products Research Laboratory, the Chemical Research Laboratory, and the Joint Fire Research Organization. Naturally, only a few items of research can be indicated in the space at their disposal, but it should be well worth while to look at what they have to show us about such matters as saving cement by use of correct aggregates, adequately controlled methods of mixing, and proper application. They also have something to say about foundations in clay, which has a nearly unpredictable capacity for shrinking and cracking. A short article on this by an officer of B.R.S. will be found elsewhere in this JOURNAL.

Space precludes even brief notice of the many exhibitors who show ways and means by which we can build, but as an indication that the spirits of the industry have not been dashed by the dolours of this post-war world it may be mentioned that the number of exhibitors has been increased by 80, that there is an increase of 20 per cent in the amount of space taken, and that for the first time the National Hall Gallery is included in the exhibition area; it can be conveniently reached by a central stairway.

In the past, exhibitions of all kinds have contained stands that may have given vent to the unbridled enthusiasm of the respective exhibitors but have not necessarily been of good design—a quality which, if anywhere, should be in evidence at an exhibition of building, since there an architect sees the means by which he can materialize his concepts; so it is pleasing to learn that more stands this year have been designed by architects, many of them being acknowledged specialists in this field. The heavy demand for exhibition space has made it necessary to restrict somewhat the width of gangways; nevertheless, the arrangement and æsthetic appearance of the exhibition will no doubt be acknowledged by most persons as showing an improvement on past years.

Wandering up and down the gangways of an exhibition is tiring, and should cause many to make for the gallery, where there is displayed a Design for Recreation, a subject somewhat neglected in the past.

The JOURNAL proposes to describe, in subsequent issues, some of the exhibits which are new, or are an improvement on former types; and members are reminded that tea may be had in the R.I.B.A. Club on the first floor, so that weary walkers may refresh themselves and muse on the old days whilst girding themselves for the battle with the new.

A courtyard in a scheme at Moygashel, Co. Tyrone. Architects: Trust Technical Staff

The Work of The Northern Ireland Housing Trust

THE NORTHERN IRELAND HOUSING TRUST was established after the war by the Government of Northern Ireland to provide housing where it was needed in the Province. Until that time there had been comparatively little public authority housing undertaken in Northern Ireland. With very few exceptions the local authorities, unlike those in Great Britain, had no housing tradition and no staff experienced in large-scale house building, layout and management. Perhaps more important was the fact that there was no great body of informed lay opinion on housing. Such a body of opinion, built up in Great Britain during the inter-war period after the publication of the Tudor-Walters report, is the real driving force in British housing today, though the importance of its existence is often overlooked or taken for granted.

In 1943 a Committee on Housing was established by the Planning Advisory Board of Northern Ireland. For this committee, the first housing survey ever made throughout Northern Ireland was carried out during the summer of 1943. It revealed a very serious state of affairs. As regards structural condition, out of a total of 320,000 houses, only about half required no repairs or minor repairs, while 42,000 or 13 per cent were unfit for habitation or required repairs over £200 in value. As regards overcrowding, 37,000 totally unfit houses were inhabited and 73,000 fit or repairable houses were overcrowded; only 200,000 or about two-thirds of all houses in the Province were habitable and not overcrowded. These figures exclude habitable houses that are technically slum because of too high a density. Indeed, no slum clearance has yet been undertaken in Northern Ireland.

At the lowest estimate 97,000 new houses were needed, more or less immediately, to ameliorate the worst overcrowding conditions; of these 24,000 were needed in Belfast, 16,000 in other urban areas and 57,000 in rural areas, including farmsteads. In general terms the Trust was appointed to provide 25 per cent of the ordinary housing requirements, the rest being left to local authorities and private enterprise. More precisely the programme, agreed with the government and at present operating, is that the Trust should provide 2,000 houses a year. A total of 6,500 houses is being built annually by all resources, the latter figure representing about the maximum house building capacity of the building industry in Northern Ireland. So far the Trust has built rather more than its share of the programme, probably because it was more quickly off the mark. It is expected that this discrepancy will disappear in time.

The Housing Trust began work in February 1945 with the appointment of a Board of five unpaid members, including one woman, and the allocation to them of an unfurnished office building. It says much for the energy of the Board that an organization was created and work pressed forward so energetically that the first road contract was let in June 1945 and the first house contract in August. At the end of 18 months, the Trust had placed contracts for over 3,000 houses on 14 different sites which had been acquired and prepared with roads and services. The first schemes were designed by private and government architects; private quantity surveyors were employed and normal methods of tendering and contract-letting were followed. Since then the Board has varied the organization of the Trust to meet problems that arose from time to time and as it has gained experience.

The present organization of the Housing Trust is as follows: The Chairman is Sir Lucius O'Brien, the General Manager Mr. J. G. Calvert, B.Com.Sc., and the Chief Technical Officer Mr. J. Cairncross, Dip. Arch.(Abdn.), A.M.T.P.I. [*A*] (who succeeded Mr. E. A. Ferriby, B.Arch. A.M.T.P.I. [*A*], on his appointment in March of this year as Chief Architect to the Glenrothes Development Corporation). The organization is in three main sections concerned respectively with acquisition of sites and legal business, estate layout and house design and housing management. The Assistant General Manager is responsible for administration.

In the case of a small town or village, typical procedure in the establishment of a housing scheme begins with a social survey. This obtains all relevant background information for the assessment of the numbers and types of houses required and for the acquiring of sites in suitable positions. The survey report covers such matters as population trends, kinds of industry or other employment (this in considerable detail), topography, existing dwelling accommodation, its densities and state of repair or habitability, the extent of overcrowding, the extent and capacities of

water, electricity, gas and sewerage services, schools, public transport, medical services, shopping facilities and their location, churches, social facilities and applications for houses made to the local authority with particulars of income groupings of the applicants: the conclusion is an estimate of the housing need to be met by the Trust.

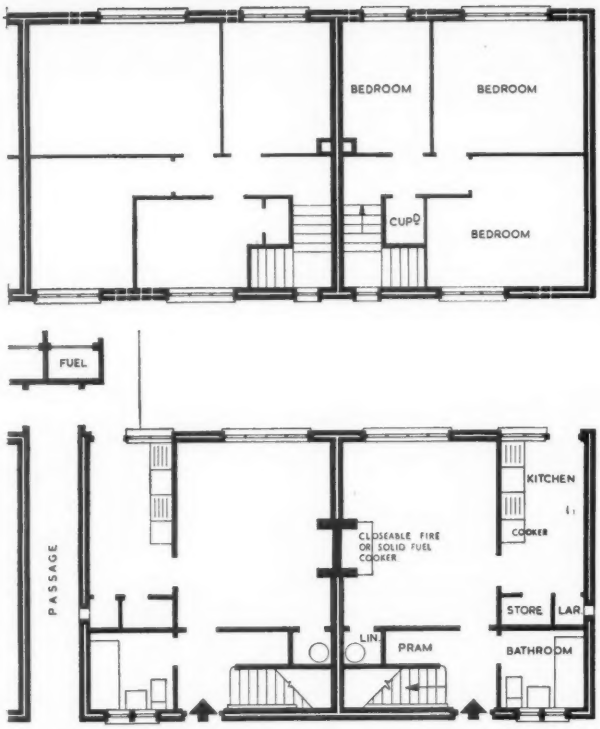
Agreement by the Ministry of Health and Local Government to the proposal to build in the area concerned is then obtained; the local authority planning officer approves the Trust's choice of site which in turn is agreed by the Ministry. The site is then acquired; in this the Trust has powers of compulsory purchase. Negotiations with public utilities for water, electricity and sewage disposal are undertaken. A scheme is planned and submitted to the Ministry and local authority for approval. This approval covers both house plans and site layout. Contracts for site and road works are then let. The amount of the work connected with obtaining approvals is rather more than in Great Britain, but this does not appear to have hindered unduly the Trust in its work of providing houses.

The Trust is financed by a floating loan from the Ministry. As houses are completed and passed by the Ministry's inspectors, the Ministry pays to the Trust the capitalized amount of the housing subsidy for 60 years; this reduces the floating loan. Accounts for each estate are kept separately and when it is completed the total cost, less the capitalized subsidy, is segregated in the Trust's books so that they can tell whether any particular estate is making a profit or a loss. With very few exceptions the same rent is charged for the same size of house throughout the Trust's estates. Where a site has required excessive underbuilding to the houses there is liable to be a loss and the Board have thought it right that good sites should help to bear the expenses of bad sites.

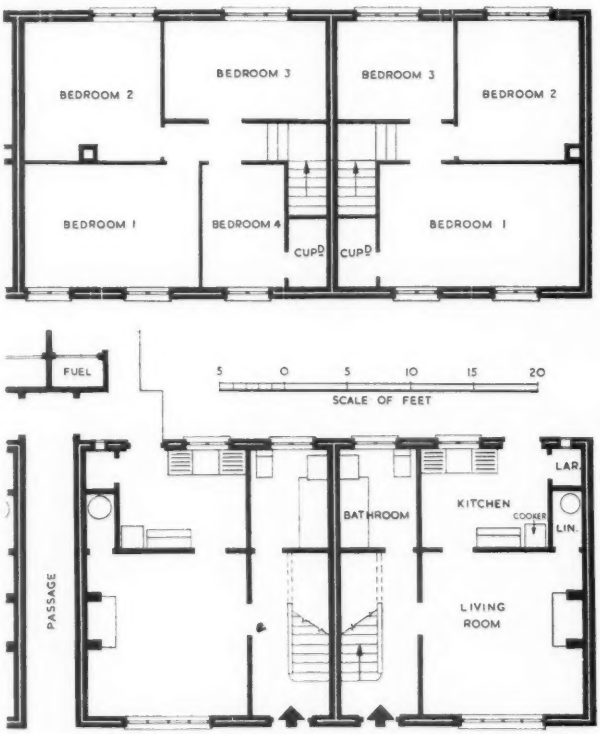
From the outset the Housing Trust were faced with a series of technical and financial problems which have influenced their activities to a marked degree. The cost of building in Northern Ireland is higher than in Great Britain. Unskilled labour is cheaper and more abundant, but against this the wages of skilled labour are higher than in any area in Great Britain except London and a large proportion of materials and equipment must be imported from Great Britain. The contracting capacity of the Province also is not great.

The local brickmaking capacity is fully extended, the demand on it for the building of factories, schools, etc., and for war damage work being heavy. On many sites the Trust has used and is still using alternative forms of wall construction, notably no-fines in-situ concrete, Easiform and Orlit. Nevertheless about half the Trust's houses are of brick.

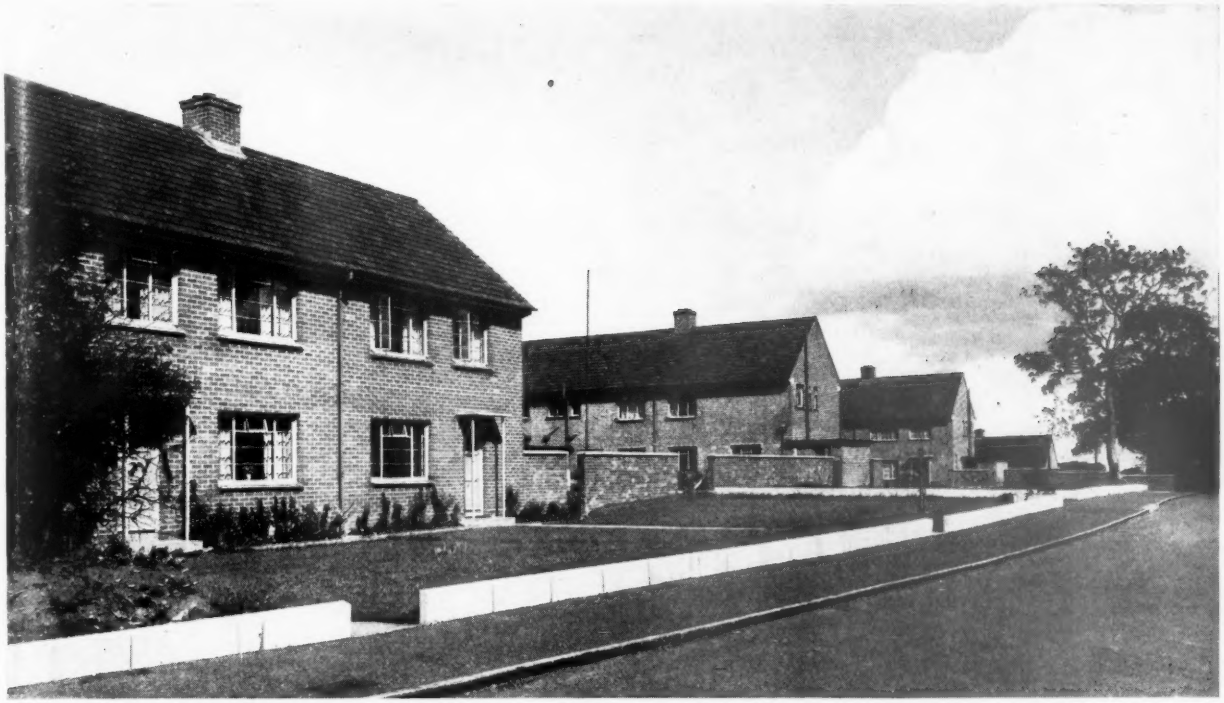
On the financial side the Trust is unable to use some of the methods employed by local authorities in Great Britain to meet the current high cost of building. Its income is derived from the rents of the houses it has built since the war, so that it can not



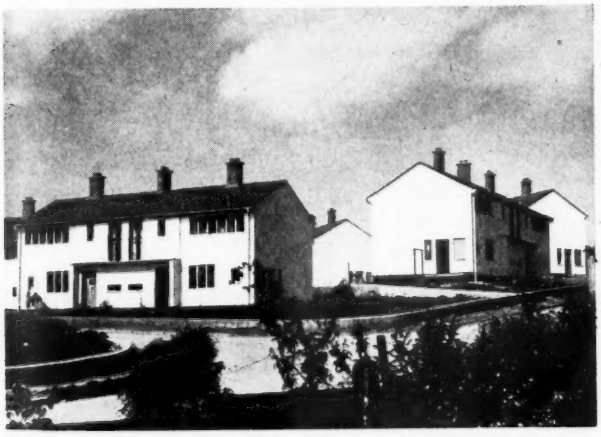
'Austerity' 800 sq. ft. houses now being erected on the majority of estates; north aspect type



'Austerity' 800 sq. ft. houses; south aspect type. The plans show the 4-bedroom house in every block of four



Typical layout of traditional houses at Moygashel, Co. Tyrone. Architects: Trust Technical Staff

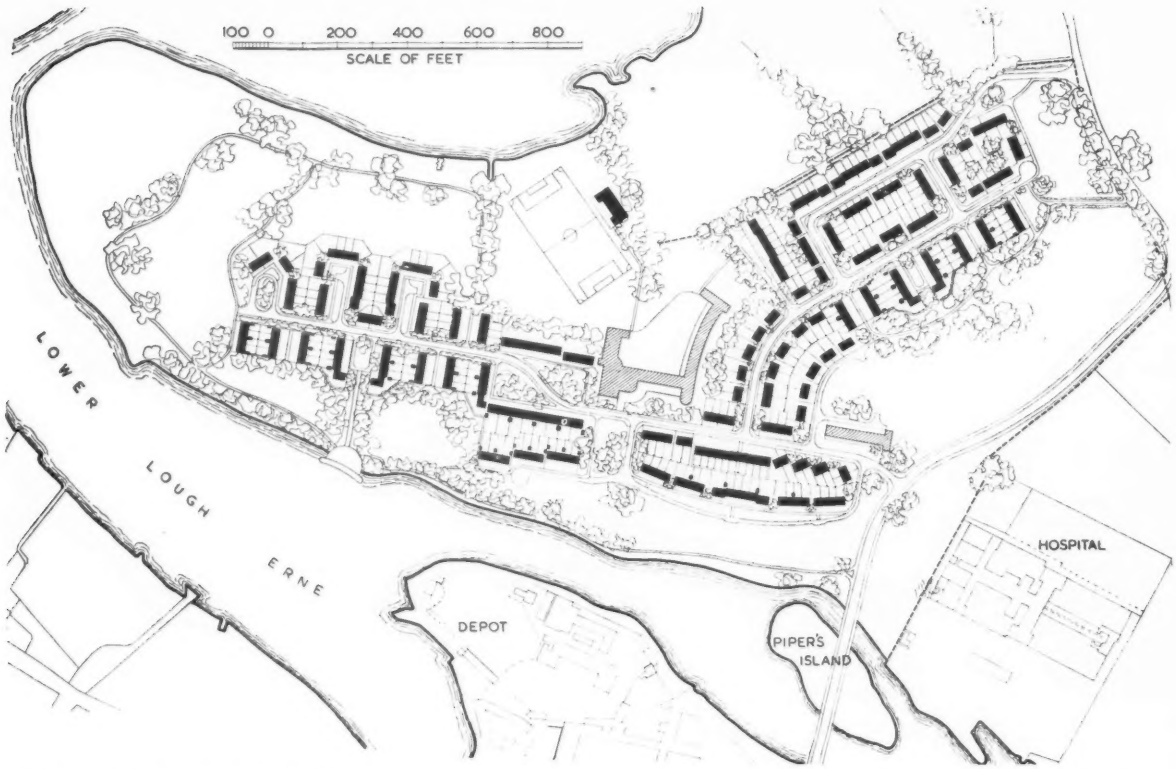


Traditional houses at Sunningdale. Architect: T. T. Houston [*A*]

No-fines houses at Newtownards. Architects: Trust Technical Staff

No-fines houses at Finaghy. Architects: Gibson and Taylor [*F*/*A*]

Easiform houses at Ballymena. Architects: Smyth and Dorman [*A*/*A*]



A scheme at Enniskillen, planned to include a future school and community centre

Orlit houses at Magherafelt, Co. Londonderry. Architects: Trust Technical Staff

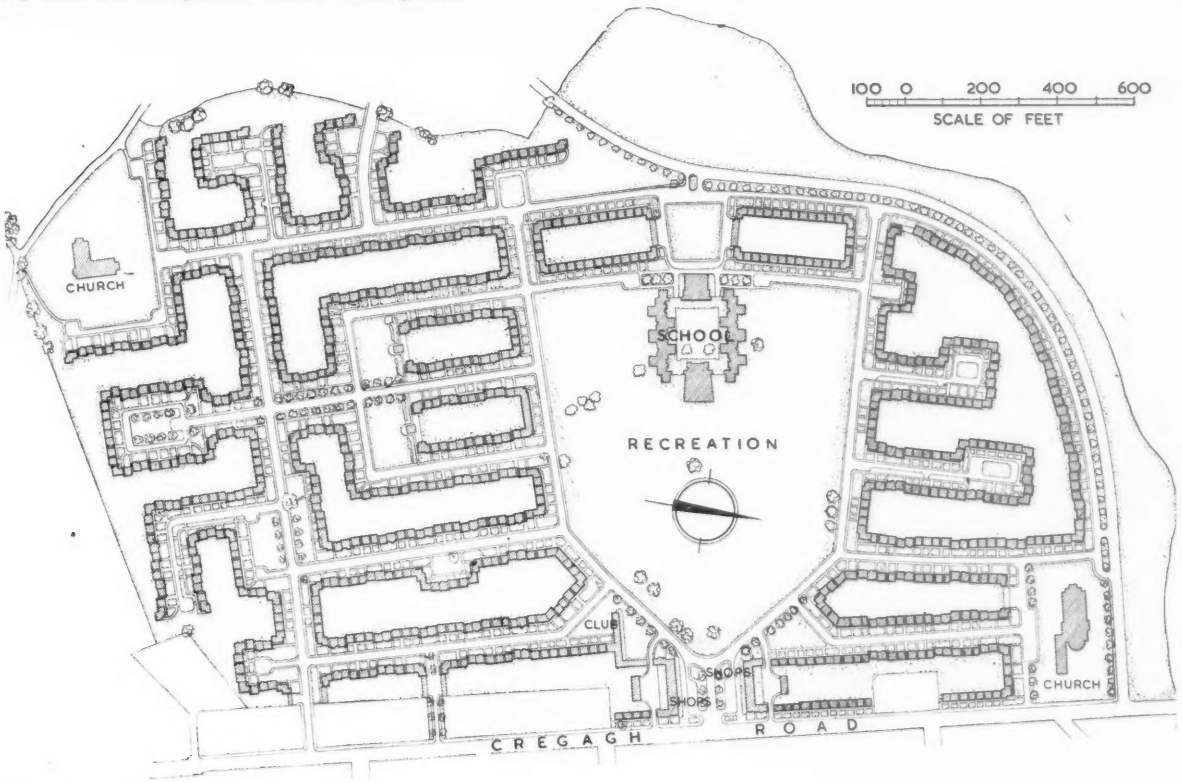
subsidize unduly costly post-war schemes by raising the rents of pre-war houses erected when building was cheap. Moreover, schemes have to bear the full cost of land, road works, fencing, etc. The Trust can not bring any item under a borough engineer's vote. In fact it has to do what very few British housing authorities have succeeded in doing since the war, namely, to build houses to let at economic rents taking into consideration all relevant charges, including office and administrative overheads. The only exception to this generalization is that the houses of the Trust rank for the Scottish housing subsidy on a four-apartment house of £30 per annum for 60 years. Incidentally, in Northern Ireland a subsidy is receivable by private builders.

Having unavoidably to build to a price, or rather to a rent, and yet to follow the standards laid down by the Ministry of Health and Local Government, the Trust has had a difficult task. It is true that these standards are rather lower than those operative in England, but they are substantially higher than those of the Tudor-Walters report and their achievement, with the present cost of building, is not easy where an economic rent has to be paid. The Board have decided that they will not exceed a weekly rental of 14*s.* a week for a four-apartment house, exclusive of rates, and up to the present they have done so except in a few special instances. At first this aim was comparatively easy to achieve but, during the latter part of the post-war period, building costs have risen 25 per cent and—the most serious blow of all—interest rates rose on 1 January 1948 from 2½ to 3 per cent; this alone would have added automatically 2*s.* 3*d.* to the rents.

It was at this stage that the Board decided to base all policy on obtaining a house at a 14*s.* rent (for four apartments), in spite of any further increase in cost or interest rates. A detailed breakdown of costs was made to ascertain whether any items were unduly high and designs were overhauled and revised; as a result, a saving of £100 a house was obtained.

The first 4,000 houses built by the Trust were of about 900 sq. ft., floor area for four apartments. The new series of designs were for houses of 800 sq. ft. built in terraces. The bathroom is on the ground floor and contains the single w.c. This leaves three good bedrooms on the first floor and gives, on the ground floor, a kitchen and a single living room. Kitchen equipment was reduced somewhat from the earlier rather lavish provision and now consists of a sink with double draining boards, a kitchen cabinet, a ventilated food cupboard and a linen cupboard. For the cooking and hot water supply there are two alternatives. Where gas is available a gas cooker is provided in the kitchen and an open closeable fire with back boiler in the living room. Where gas is not available, solid fuel cookers with boilers are provided in the

Plan and part view of the Cregah scheme, Belfast. Architect: T. F. O. Rippingham [*A*], Chief Architect, Ministry of Finance. An early scheme having continuous frontages and no views of back gardens



living room, and an electric power point in the kitchen. There are no fireplaces in the bedrooms but electric plugs and Colt wall ventilators are provided. Each house has an outbuilding of 28 sq. ft. floor area.

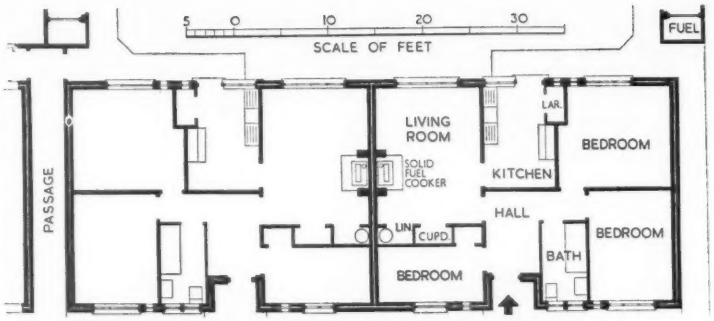
The house plans reproduced on p. 10 are of this 'austerity' type dwelling. They constitute the bulk of the Trust's housing that is now under construction. The Trust are, however, now developing a revised design, of 830 sq. ft. with a kitchen-living room and a parlour, in response to popular demand.

It was also decided, when economies had to be made, that there should be no change in regard to housing densities or that the ample site layouts hitherto provided should be restricted. The only economy in site works was some reduction in the widths of access roads. The front gardens are defined by low concrete kerbs and the back gardens by concrete posts and wire.

Architects who are accustomed to the general lavish provision of space and equipment (for example, the second w.c.) which has characterized post-war housing in Great Britain may be inclined to regard these house designs as retrograde. The Board have no such view. The houses are not below pre-war housing practice in Great Britain and are in some respects above it. Moreover, their single all-purpose fire (which can burn peat) and the absence of such fittings as immersion heaters and gas coppers keeps down the running cost of the house, a point not always fully considered in British housing. Two other facts also must be noted: the average rent paying capacity is lower than in Great Britain (farm workers' minimum wage is 10*s.* per week less) and the general standards of existing houses are lower on the average than in Great Britain: working class tenants find these houses palatial compared with the very poor accommodation to which many of them have been accustomed. Further, and most important, the Board feel that they are following a right policy in building to an economic rent, and they tend to hold the view that in so doing they are merely anticipating a policy which will have to be followed in British housing when the full force of the present economic difficulties is felt.

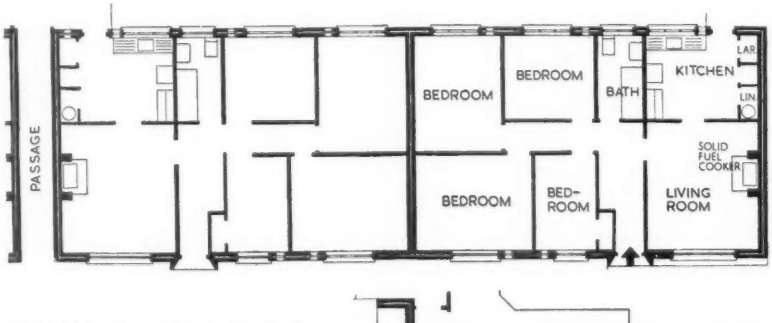
It must, however, be pointed out that a rent of 14*s.* a week, plus rates, is too high for the lowest paid worker, especially in the remoter rural areas where inclusive rents are often 2*s.* and lower. Indeed, the whole problem of providing good quality houses in these areas is almost insoluble. Not only is the rent paying capacity low but there are no large contractors or an adequate pool of skilled labour. Nevertheless, the Trust are attacking the problem though it is realized that tenants for the new houses will be mostly better paid workers and that, with the present cost of building, the operations of the Trust can do little more than ensure some 'filtering up', that is to say, the poorest paid workers may secure cheaper houses that fall vacant as a result of the new houses being occupied. The Trust is very conscious of the need to develop a house for rural areas which can be let at less than 14*s.* and continuous effort is being made to achieve this.

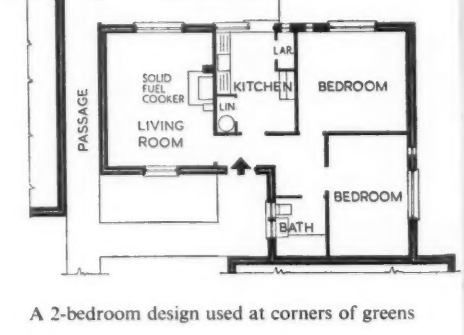
Towards meeting the rural problem, a single storey cottage design has been developed. This design follows the native tradition of the 'cabin' in having plain colour-washed walls and a simple gabled roof. Internally, it has the same equipment and finish as the larger houses. The cottage types are planned with two bedrooms, three bedrooms (708 sq. ft.) and four bedrooms in



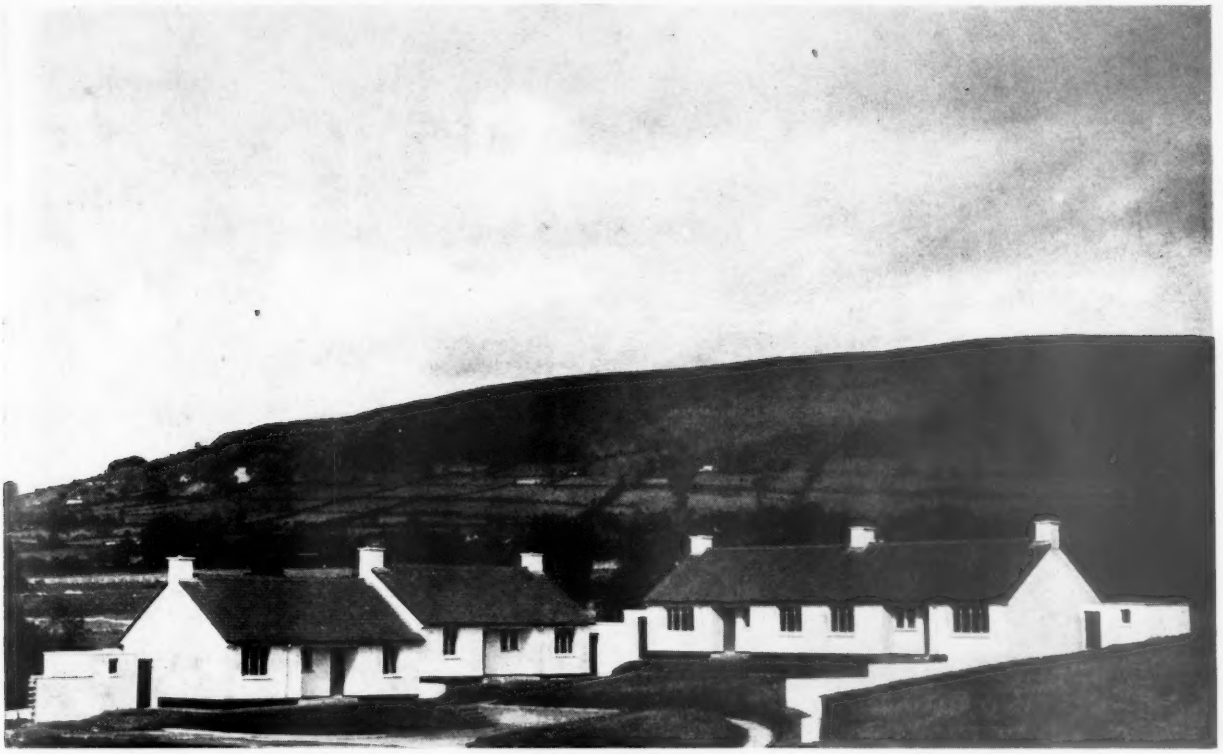
The 3-bedroom rural cottage: above, north aspect; below, south aspect

The 4-bedroom rural cottage: above, north aspect; below, south aspect





A 2-bedroom design used at corners of greens

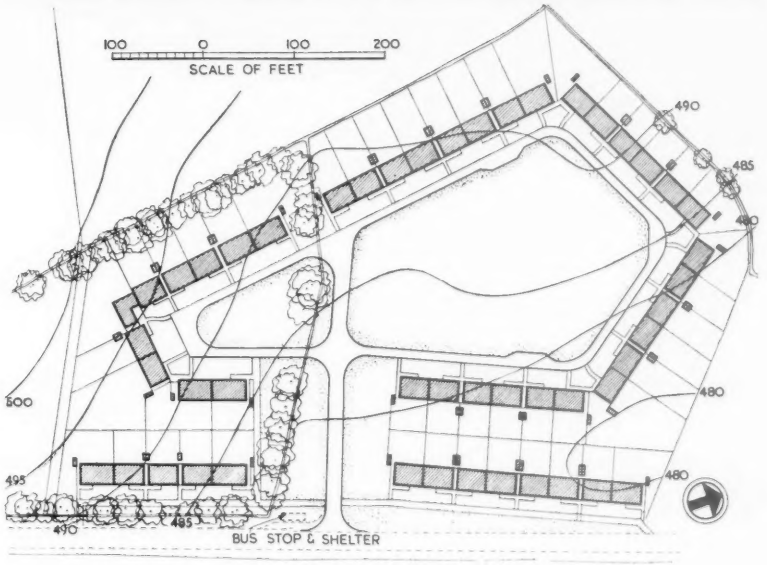


Prototype rural cottages at Falls, Belfast. Architects: Trust Technical Staff

two types, north and south aspect. They are built in terrace form and mostly grouped round central greens. On a typical uneven site, skilful stepping up of the blocks makes very pleasant compositions and the schemes harmonize well with the local traditional building.

One advantage possessed by the Northern Ireland Housing Trust is that most of their sites are set in superb scenery. Few of them are entirely flat and the majority have fully grown trees. These sites give the Trust architects a chance which has been well taken. All the site layouts, of which we reproduce a few typical examples, are both imaginative and technically sound. It is true that the irregular nature and small scale of the country often make difficult the obtaining of sites that are easy to develop, and the variety of levels raises costs by requiring expenditure on underbuilding, but in the great majority of cases solid virtues have been drawn from these necessities.

It should be realized that to a body such as the Northern Ireland Housing Trust, the provision of houses is only partly an architectural problem. For architects, the architectural side naturally predominates and they are liable to pass lightly over the financial and organizational aspects. They also tend to look upon a finished scheme as an end in itself, whereas to a body like the Trust, and certainly to their tenants, it is only a beginning. Housing management is an important part of the Trust's work, if



Typical layout of single-storey rural cottages at Keady

only because the experience so collected will have an important influence on future schemes. The Trust's women housing managers, who are trained in the Octavia Hill system, have much more to do than merely collect rents. Often they have to advise families on such matters as their weekly budgets or how to make the best use of the modern equipment provided. Most tenants come from poor and overcrowded dwellings and have never before had a home of their own. The women housing managers even have to trace any fault in the house, deal with the minor ones and report all the more serious defects. They have to see that the Trust's duties as landlord are scrupulously carried out and to convince the tenants that they also have

Orlit houses at Whitewell, Belfast. Architects: Trust Technical Staff

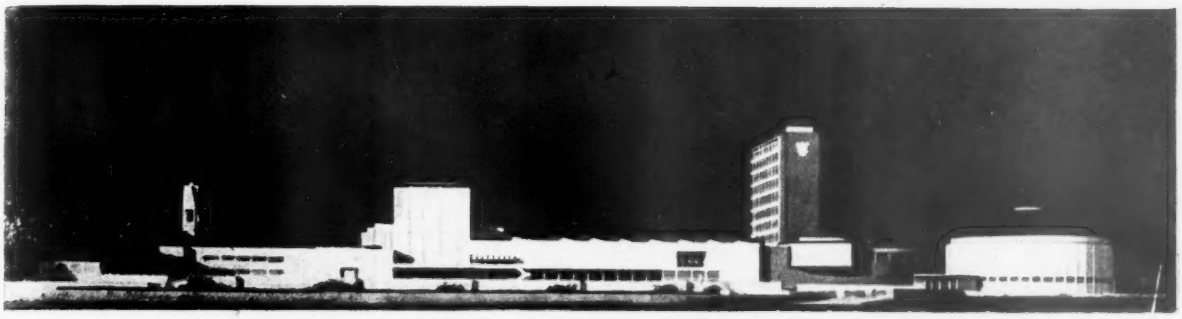
Single pitch roof traditional houses at Lisburn. Architects: Bell and Malcolmson [*A/A*]

duties to the landlord's property and to the amenities of the estate. In all this they have to create a feeling of mutual confidence between the Trust and the tenants and to demonstrate that the Trust is a benevolent public body different from the average landlord to whom most tenants have been accustomed.

One problem which still needs a satisfactory solution is concerned with the use of the open communal spaces provided in the housing schemes. So far the Trust has followed good housing practice in providing these spaces, but, concerned as it has been with the urgent need for houses and the difficulties and high cost of providing them, little time and money have been devoted to the development of open spaces. Trees have been planted where needed, the grass is kept cut and the open spaces tidy, but no more has yet been done. It is easy to *say* that open spaces should be laid out as play spaces with paddling pools and other amenities, but the Trust is still young and is putting what money it has into providing house accommodation for the thousands who need it. The open spaces have to await the creation of a communal spirit among tenants and the eventual building up of reserves by the Trust, reserves both of money and of staff time for the detailed consideration necessary.

Up to the present the Trust has built 4,250 houses; 2,400 are under construction and sites have been acquired or earmarked for 2,500 more. The houses built and building are spread over 50 sites. These figures appear small against those of the demands for housing, but the post-war era has taught us that good housing can not be provided under present-day conditions at the speed which many politicians have rashly assumed. These figures represent a good beginning in a public work which is of first importance to the well-being of the people of Northern Ireland and one which will grow in importance as the years pass.

ERIC L. BIRD



A view of the model for Harlow, by Frederick Gibberd [*F*], showing the segregation of buildings according to their use

Economy in the Use of Steel in Building

By L. W. Elliott, A.M.I.C.E., A.M.I.Struct.E. [*A*]

Read at a Meeting of the R.I.B.A. Architectural Science Board on 11 October 1949. M. Hartland Thomas [*F*] in the Chair

AS THIS PAPER is primarily for architects, the greater part of it will be concerned with the use of steel in the architectural sense, and not so much with the more specialist technical use with which engineers are more familiar, although it is interesting to know of technical developments in order that we can see what the engineer can do to save steel.

It is unfortunate in a way that shortages of any particular material are made the subject of economy drives, as it reflects to a certain extent the fact that we are not being as aware of technical advances as we should be. It is even more unfortunate when an economy drive leads to higher costs by the use of unsuitable substitute materials, especially when the substitute material is used to its own detriment. On the other hand, the need for economy does stimulate research, not from the technician's point of view as they do not need a great deal of stimulation, but from the point of view of support from the Government or public bodies.

If one examines the history of the use of steel any technical advance has produced a wasteful period. At first there is a period of caution, and as soon as confidence is established, usually by the erection of a large bridge or public building, everyone clamours to use the material to the detriment of existing materials doing their job effectively.

The history of steel commences in the latter half of the 18th century, when pit coal began to be used instead of charcoal and blast furnaces and forges were set up. The first structures were cast iron bridges, and Telford was the designer of most of them. The structures were exceedingly daring, especially as no one knew the crushing strength of cast iron until a suitable testing machine was built at the beginning of the 19th century. After this early period further structures had to await the end of the Napoleonic wars, as the foundries were fully occupied with demands for cannon. Machinery, and especially railway developments, played a large part in introducing iron into buildings, as the engineers responsible for machinery were usually responsible for the buildings and bridges for use in connection with the machinery, and tried out their beams and structural elements. With the advent of the machine age fires occured and accelerated the demand for 'fireproof' buildings and iron columns and beams soon came into general use.

The leading architects soon made considerable use of cast iron; John Adam was even a director of the Carron Ironworks and the architectural uses of cast iron are well known. During the middle of the 19th century the supremacy of cast iron was challenged by wrought iron built up into compound sections riveted together. The warren girder, too, was brought into use, and the framed structure, actually pin-jointed with one pin, began to evolve. The girders were usually cast into prefabricated units, and the height of this development occurred in the Crystal Palace. The development of manufacturing processes for steel, especially the rolling mill, set the pace for such structures as those erected at the Paris Exhibition of 1889, now unfortunately dismantled.

The multi-storey building frame had its beginning in America, and the first steel-framed buildings of today were built as a result of experience in Chicago and elsewhere in America. The General Electric building and the Ritz Hotel erected in 1905 were two of the earliest, and from their outward appearance there is no trace of a steel frame. The Ritz however is a most interesting building, as the bye-laws were requiring the statutory wall thicknesses even though they were carried on a frame, and the idea of using a steel frame was almost abandoned until the District Surveyor thought of a brilliant way of getting over the difficulty. The bye-laws permitted flues within the wall thicknesses without apparently restricting the number, so why not save weight by piercing the walls with hundreds of flues. It is also interesting structurally as unobstructed ground floor areas were required for the restaurants, and this was achieved by taking advantage of the floor height of the bedroom floor above for the insertion of deep warren girders. Since that time bye-laws have taken into account the use of steel and, later, reinforced concrete.

The introduction of reinforced concrete was much slower, and, as might be expected, took the form of the steel frame until such people as Robert Maillart, the well-known Swiss engineer, realized that steel or wood was a one-dimensioned element and restricted any development in the realm of pure shape in three dimensional form. It is true that concrete was being used, but only in the slab form for infilling between joists and balconies in the same way as stone slabs were used earlier. Maillart, however, commenced his experiments on the flat slab or mushroom construction as early as 1908, with the first building erected in 1910. Continental engineers have continued to exploit the potentialities of reinforced concrete as a shape-forming material, and we have systems of construction popularly known as mushroom, box frame, and shell construction. In point of fact, the achievements of the British engineers of the industrial revolution with such structures as the Forth Bridge, railway stations and railway bridges, where the basic structural forms of the cantilever arch and beam were exploited to the full, have not been surpassed, at least not until the last war. The advance has chiefly been in the technique and not so much in application, although there have been notable exceptions.

In the field of aircraft structures, much more has been done in this country. The scientists and technicians in this field have developed enormously with, of course, much more original work. They have had the advantage of smaller structures and full-scale tests, but much of the early experimental work is done with models. One of the great points about aircraft design is that the maximum amount of strength has to be obtained with the minimum weight.

A mushroom type structure

It is a pity that similar work is not done for building structures, but one of the difficulties would be the regulations and bye-laws as there is no positive machinery to ensure that the results of research are quickly embodied in them, but even so, the principle of maximum strength for the minimum dead weight is surely within the power of the architect.

I am not going to say a lot about bye-laws and standards, as they are a necessary evil. They all set minimum standards, and any increase in those standards, especially in regard to stresses, demands high-class workmanship, good supervision and design. We are constantly talking about the modern building doing away with craftsmen, but this is not so. Any startling advance in the permissible stresses can not occur until we have a higher standard of execution than we have at present. I am sure that this is possible—we must as a first step create special classes of tradesmen to cope with reinforced concrete work.

There are, of course, new ideas on the behaviour of structures under load, and I hope the statement 'factor of safety' will soon become recognized for what it is—a factor of ignorance. Fuller investigations have been started on the behaviour of steel frames within the plastic range as opposed to the elastic behaviour which gives unsatisfactory results when applied to rigid structures, as is shown in the Final Report of the Steel Structures Research Committee. This is a complex subject and outside the scope of this paper, but this research proves that more economical designs are possible although, of course, once more our latest bye-laws or standards will become dated.

A further problem is that the design offices responsible for structures are not as alive as they should be to the newer methods of structural analysis, although special courses are now being carried on as a result of this steel economy drive.

It is desirable to explain the important differences which have now occurred in the latest codes of practice for reinforced concrete and structural steel. Dealing with concrete first, the new permissible stresses are for direct compression 760 lb. per sq. in. as before, but 1,000 instead of 950 for compression due to bending with a similar increase in the shear stress from 95 to 100 lb. for 1 : 2 : 4 concrete. For a richer mix of 1 : 1 : 2 the old code gave 1,000 lb. direct compression and 1,250 bending, and this is now increased to 1,140 lb. direct and 1,500 lb. bending, thus making it now more economic to use a richer mix. For steel reinforcement the stresses have been increased for steel with a guaranteed yield point up to one-half the yield point stress, but not more than 27,000 lb. per sq. in. for bending, and an increase from 13,500 to 18,000 lb. for mild steel used as column bars. Any further increase might cause deterioration in the structure due to cracking, and even so it is as well to keep the percentage of steel within reasonable limits. The other steel saver is that welding of reinforcement is now permitted for all work, thus saving space and steel required for laps.

The British Standard for structural steelwork has also been revised, and this is much more serious for the architect who relies on a steel section handbook, as these have all now become obsolete, although steps have been taken to provide revised safe load tables temporarily.

The principle changes are the increase of stresses from 8 tons to 9 tons for tension, and 8 tons to 10 tons for bending, or a value depending on the yield point for higher grade steels with consequent increases in the shear stress. Furthermore, the concrete casing is now taken into account for stiffening the structure. The increased stress, however, must be treated with some caution, because the increased stress allowance will pronounce some members as safe whereas the deflection would be excessive. Sometimes I think that undue attention is paid to deflection, especially where finishes are not affected. Some people tend to treat the deflection as due to the total load whereas the effective deflection causing damage to finishes is only the difference between the deflection of the dead load and the deflection of the total load. For purpose-made frames or trusses for light loading, it might be worth slightly cambering the beam to avoid any unsightliness due to deflection.

These changes are the present legislation within which we can design our structures, and they do represent an advance and show savings. In recognition of this fact it has been officially stated that evidence must be produced when applying for a licence that the structure has been designed in accordance with these latest codes.

Any further savings in steel then, must be achieved by design in its purest sense, for whatever system is used. The basic structural elements, the beam or slab, column or wall, or arch or dome, are capable of being used singly or in combination and they all have optimum shapes which are economic for that particular shape, the relation between the depth to width of a beam, the height to diameter of a column or wall, or the rise to span of an arch or dome should be studied during the training of an architect or be known as a result of experience.

In this question of structure, the engineer is important, and it is useful to describe how he should work. One usual fallacy concerning an architect's views on an engineer is that he is, or should be, a mathematical genius able by some extremely complex formulæ to make an

The Schwandbach bridge by Robert Maillart, showing economy in material by good design

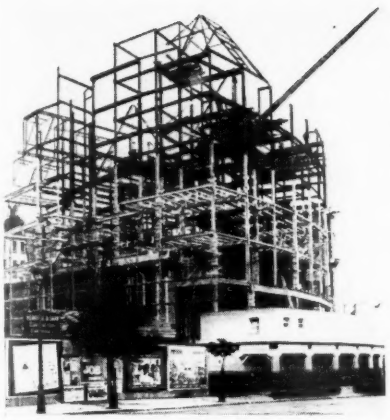
architect's building structurally sound. The engineer should be just as creative as the architect, and by his training should know how to create economical shapes. Mathematics is to him a tool to be used as a means to an end, and not as an end in itself. In fact, the mathematical work required for a lot of modern structural analysis requires specialist attention in order that it should not become an obstacle to structural advances. Just as in the Industrial Revolution advance came about by the machine carrying out the physical work, so the mathematical machine or specialist should relieve engineers and architects of the laborious mathematical analysis necessary for the work of our time. At the same time research work should be carried on to develop simple methods of structural analysis for everyday use in offices throughout the country for the design of rigid frames, as the existing methods are too cumbersome and need more time than is normally available.

Structural engineering is to me an integral part of architecture in that its aim is to create shapes and enclose space in a satisfying and efficient manner, and the engineer should not be the tool of the architect but his partner. Shapes and form essentially need creating and are therefore architectural, the analytical part of the work is essential to satisfy the stress conditions but it only tells us whether the shape is an economical one. A skilled engineer will know that when creating them, and ideally an architect should know that too, but when training much of his time is spent in analysing structural members instead of shapes.

The essential genius of Robert Maillart was that he spent more time creating shapes in the form of his wonderful bridges than analysing them. In fact, his calculations were almost childlike with assumptions as to the behaviour of his material which frightened the authorities but which proved to be substantially correct when his bridges were later tested by the authorities.

Steel Utilization. Steel is utilized in varying forms, the familiar rolled steel sections, joists, angles, tees, together with tubular sections, sheet and strip and wire or rods.

The usual way in which it has been used in the past is in the form of rolled steel



An uneconomical steel frame due to a complicated design

sections for steel framework, and rods for reinforced concrete. Between the wars the majority of our buildings using a structural frame were of steel. This was carried out with sections riveted together and usually encased with concrete to render it fire-resisting. The beams were commonly designed on the assumption that they were pin-jointed to the columns, which were continuous from floor to floor. This system was simple to design, and could be fitted into almost any building the architect could design. In fact, this was usually the case; the building was designed and the architect automatically dictated the column centres either by his internal planning or by the fenestration, and a set of $\frac{1}{8}$ in. scale plans went to the engineer if the client employed one, or otherwise to a firm supplying the steel. I have known of alternative designs prepared in steel and reinforced concrete, all within the architect's original design.

This was, of course, an extremely wasteful method of using steel and taxed the skill of the engineer in the wrong way, as most of his time was spent in discussions with the architect as to whether or not this beam or that column could project into a room, and all sorts of devices were thought of such as shallow plated beams or false ceilings and these had often to be used to adhere to the architect's wishes.

The advantage of this system was its simplicity, and it could be carried out by anyone reasonably good at simple arithmetic and able to read a section handbook. Apart from the simple pin-jointed basis of design the chief reason for the sometimes wasteful use of steel lay in the architect's design not being suitable for an economic steel lay-out. Furthermore, the pin-jointed structure was hardly achieved because of the restraint provided at connections by the rivets and assisted by the concrete casing. Frameworks can now be designed on the basis of a semi-rigid design in accordance with the recommendations of the Steel Structures Research Committee, although the savings in steel are not as great as they could be.

Welding, too, is now being carried out more extensively, and this is to be preferred rather than the adoption of the semi-rigid method, and both welding and riveting can be carried out on the same job although a word of caution is necessary as, if the riveters and welders are on the same job, a certain amount of costly waiting time for either trade may be necessary. It is also unfortunate that the necessary stimulus cannot be given to the progress of welding by a saving in cost as well as in steel. The reason for this is that established fabricators have overheads for machinery set up for riveting, electrodes are expensive, and very few shops are set out for the effective production of welded steelwork. The savings in steel that can be achieved are 15-20 per cent for heavy girders, built-up columns, 14-16 per cent for normal steel-frame buildings.

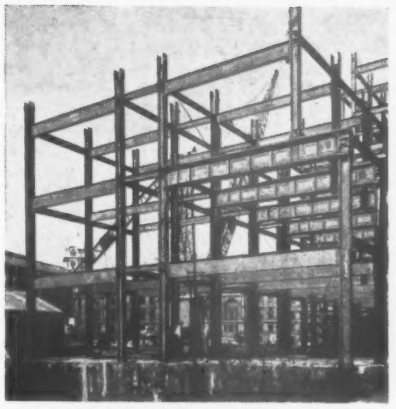
The use of high-tensile-strength steels should show a saving in weight of the order of 15-20 per cent, but it should be mentioned that there is a greater wastage during manufacture than with mild steel. These steels have been in use for naval work and bridges for some years, and nearly half a million tons were used for Bailey bridges during the war. For structural steelwork, the increased working stresses of 13 to 15 tons per sq. in. as against 10 tons, give some indication of the savings.

The best development in the use of high-tensile steel has occured in reinforced concrete work, where economies in weight amount to as much as 30 per cent, and although the steel is more costly the economy has been substantial enough to have led to progressive development in a competitive market.

Perhaps the greatest economy in the use of steel, as far as concrete is concerned, can be achieved by using suitable high-tensile steel in the form of wire for prestressed concrete work, and even during the past year considerable advances have been noticed in this field and adequate facilities are now available for production both in the precast form and on the site.

Another recent use of steel for building structures is in the cold-formed light-gauge steel strip sections which can be rolled to practically any shape within an overall 16 in. width of strip, and there are even larger mills in America rolling up to 24 in. The gauge of metal used varies from 10 to 24 gauge, and the strip can also be formed on press brakes from steel sheet. Its principal use is for lightly-loaded structures, generally built up by spot welding into trusses and frames, although there is no limit to the variety of shapes produced. Corrosion problems have to a certain extent restricted development, but substantial advances have been made to enable development to proceed. I have seen experimental beams manufactured to a suitable shape to enclose concrete which has stiffened the steel membrane and improved the strength considerably.

The weight saving by using this form of construction can be in the region of 30 per cent, but design is at present somewhat



Column loads carried on plated steel girders. The lower beam gives an idea of the necessary size without the column setback

difficult owing to the absence of a standard of any sort, although there is American design material on the subject.

There is also the similar type of construction built up into the form of lattice girders and frames with tubes which by their shape are economic for members in pure compression and tension. The principle difficulty in the past has been the means of connecting the members together, but welding has overcome that. In the same way rods and bars can be fabricated into the form of open-web beams giving good economy when used for lightly-loaded structures such as for classrooms and schools generally. Rolled steel sections can also be flame cut and re-assembled into deeper joists for light loading.

The Justifiable Use of Steel Substitutes. It is unfortunate that whenever a shortage or economic plight overtakes the country, substitutes are evolved and their use pursued with the utmost vigour to the detriment of the material being used as a substitute. Immediately after the war steel and aluminium was used instead of timber, and when these materials became scarce, due to various reasons, precast concrete and later prestressed concrete were used in place of steel without due regard being paid to economy. It is not suggested that other materials should not be used in place of steel, but that their use should be appropriate to the work required to be done. For example, aluminium alloys have excellent qualities, lightness, non-corrosive, good strength, ease of fabrication into extrudable shapes, and resilience.

This last quality, resilience, establishes the fact that aluminium alloys can not be directly translated into the same form as steel members because the modulus of elasticity is only one-third that of steel and therefore greater deflections occur. In order, therefore, to obtain the same stiffness more metal is used at greater cost than the original steel member, whereas the best way to use aluminium alloys is to alter the form of members to distribute the metal over a greater depth. Very frequently, in appropriate cases, aluminium can com-

pete with steel due to the ease with which complex shapes can be extruded, especially for lightly-loaded members.

Another substitute for steel is prestressed concrete, and here again care must be taken to see that this is an economic substitute. The direct translation of steel members into precast, prestressed, concrete members is uneconomic and restricts the material's use, especially if a wide range of members are fabricated and used from stock as are rolled steel joists. On the other hand prestressed concrete is an excellent material for long span members where steel trusses or girders would normally be used. It is quite possible to reduce the structural depth required for an economic steel truss with, of course, a cleaner-looking job.

Planning and Architectural Design. The architectural form of a building can have a tremendous effect on the economy of the structure, for example, tall thin buildings require extra structural members to cope with the wind stresses, whereas the introduction of a curve or a set-back can avoid this. Another serious factor is when one floor is set back from the floor below, necessitating the columns being carried on heavy beams. Heavy point loads on beams should be avoided at all costs, especially when the point load is transmitted through several floors.

In the same way the usage to which the building is to be put can have a very great effect on the amount of steel used. One of the worst factors influencing the economy of the structure is to have one building used for more than one occupation or use. An example of this is an hotel where clear spans are often required on the ground floor, with small rooms over, or a block of flats with a cinema underneath. These problems are sometimes interesting for the engineer, and I am not suggesting that they can not be solved economically, but as a general rule the road to economy lies in simple treatment of blocks of buildings for what they are—cinemas, concert halls, swimming baths or restaurants, grouped within the residential or shopping area—each building serving the function for which it was designed. I realize this is very idealistic, but simplicity is an ideal to be sought after. Structural simplicity is a long way towards steel saving whether the building be carried out in steel or reinforced concrete.

Fortunately, the preliminary plans of our new towns all strive towards this planning. This planning factor is probably the most effective one the architect can make towards economy, but there is another important one too, and that is the construction.

A motor car is designed to transport a fixed number of passengers, but the weight of the vehicle itself decides the power of the engine for the same performance. In the same way the occupational loads for the building are selected in accordance with acceptable figures, but the dead weight of the building can be varied considerably. Obviously the lighter the weight of the material used, the more saving we can make in the structure, and during and since the war there has been a steady development in the use of light-weight materials—aerated concrete, foamed slag, glasswool, vermiculite, and aluminium alloys to mention but a few. Quite a lot of information has been given on these through the efforts of the Architectural Science Board alone.

In Sweden, for example, light-weight concrete, known as Siporex, has become a standard building product, not only for cladding but also for structural floors and roofs, and there have recently been erected two very interesting buildings in America where the architects set out to cut as much weight as possible to give larger spans with less columns, and to save cost, not necessarily steel. These buildings illustrate this point so well that I should like to describe them. The heading to the article which appeared in the May issue of ARCHITECTURAL FORUM, reads 'Light-weight aggregates and trick framing cut the two buildings' weight by 28,700 tons.' The buildings were for offices, and in one building the dead weight was reduced to 25,800 tons to carry a live load of 8,300 tons, a ratio of approximately 3 to 1, and in the other the dead weight was 32,000 tons for a live load of 14,300 tons, which is little more than 2 to 1. In each case about 1,000 tons of structural steel were saved or about 25 per cent of the normal construction.

The principal savings were achieved by using pumice concrete at about 90 lb. per cubic foot instead of 140 lb. for the structural work, and vermiculite plaster at 25 lb. per foot run for the steelwork fireproofing, instead of concrete at 225 lb. per foot run. The framing was interesting as deep light-weight trusses the full depth between windows on each floor were used and these saved steel in the columns by cutting down the unsupported floor to floor height.

A secondary feature was that the thermal insulation was improved by the use of the light-weight concrete and vermiculite plaster. I consider this an important method of saving steel, and one which is directly under the control of the architect, although the public may love massive buildings and popular description of buildings usually contain references to the quantities of materials used in an overawing way. Descriptions such as, so many train loads of cement were used, or if the bricks were placed end to end they would reach from London to Edinburgh, or the total weight of structural steel is equivalent to the weight of one of our largest battleships, are all very well for the imagination of a schoolboy, but it must not be forgotten that massive structures are not necessarily more stable. Movement due to settlement of the ground and changes in temperature are much more troublesome where mass is concerned. A light integrated constructional system is likely to cause less trouble in the long run. In most of the above-ground remains of antique buildings slender columns are frequently left standing whilst the massive ones have crumbled to pieces.

And now for the structural systems suitable for different classes of buildings.

An experiment in pure form with economy in material. Robert Maillart's Cement Hall at the Zurich exhibition in 1939

Single-storey structures with small roof spans, chiefly occuring in schools, are best dealt with by the use of a portal frame, either in precast concrete or steel. The question of whether to use steel or concrete is largely determined by the weight of the roof covering. With a light roof covering weighing, say, 20-25 lb. per sq. ft. and a span of, say, 25 ft. a rolled steel joist frame welded at the corners is quite economical and shows a saving of up to 25 per cent over the riveted frame, and as the frame is a rigid one no additional wind bracing is necessary. Quite a variety of shapes can be obtained by this method and the welding confined to the works by providing site joints at approximately one-fifth of the span from each end at the points of contraflexure, where the moments are at a minimum. Alternatively, the built-up lattice type of light joist can be used as in the schools erected by the Hertfordshire County Council.

For the heavier concrete type of roof, and where repetition of units is possible, the precast concrete frame is good, especially if prestressing is resorted to. I should like to make the point here and now that with developments in precasting techniques, concrete is suitable for most of these light structures as well as for heavier buildings.

For the single-storey buildings of long spans for industrial and commercial use with the normal types of loading, the type of structure in the past has been of built-up lattice girders, but shell concrete has now been developed in this country and also prestressed concrete. These systems can be used in conjunction as in the aircraft hangars at Karachi.

When steel is used, possibly the tubular type of space frame is good, especially when arched. The frame can be prefabricated in relatively small units and

assembled on the job. There have been a number of excellent buildings erected in Italy on this system with the use of precast concrete elements, notably the automobile exhibition hall in Turin, and some aircraft hangars near Rome. Some countries such as Italy have always suffered from a steel shortage, and a study of some of the recent buildings carried out show that they deserve close attention.

For multi-storey buildings for moderate loadings such as for flats, offices and hospitals, there is little to choose between steel and reinforced concrete, but if the shuttering problem can be overcome by economic design permitting a repetition shape, concrete is definitely the best from a steel economy point of view.

There have been quite a number of proprietary systems for precast concrete construction, and more development work should be done in this form of construction to save time, which so often is an important factor when deciding whether to use steel or concrete.

From the steel frame point of view there have been a number of interesting developments in the past by combining the use of a steel frame and reinforced concrete. The general principle was to design a light steel frame just sufficient to carry the weight of the cranes and the dead load, and then to cast concrete and reinforce it to cope with the live loads. Quite a number of buildings were erected before the war on this system, and they seemed to make a compromise, from the cost and economical point of view, between steel and reinforced concrete. In some instances they were complicated buildings to erect, necessitating high-grade concrete for the steel casing and much detailing on the part of the engineer, and were not generally successful. Again, the Mopin system of construction as erected in France and Leeds was similar in a way and gave a light steel structure.

For heavily-loaded multi-storey buildings such as warehouses and factories, reinforced concrete seems to be the ideal material, especially when used in the flat slab form of construction. Examples of this type of building are to be found in Boots factory at Nottingham, the Van Nelle tobacco factory in Holland, and Peter Jones store in Sloane Square.

Special buildings, such as concert halls, theatres and transport buildings, can only be treated on their merits, but it should be pointed out that the form of the building is the all-important factor. On these types of buildings it is absolutely important that the specialist engineer be consulted before any shape is decided upon, together with other specialists, such as acoustic engineers. Shell concrete, prestressed concrete and welded steelwork really can show savings in these types of buildings, and great care should be taken when deciding on the structural system.

One must always be alive to the question of whether to use more than one structural system in a building. Frequently it is economic to carry out parts of a building, such as ground floors and staircase towers, in reinforced concrete and the remainder in steel. Often a designer selects steel framework for the whole of a structure just because certain parts are more suitable for steel whereas possibly with the use of prestressed concrete for those particular parts, the whole building could be carried out in concrete.

Unfortunately, there is little published information on the economics of various systems of framing for buildings generally. It can only be hoped that something can be published similar to the German *Stahlbau Kalender*, a designer's handbook published annually and containing a record of most of what is interesting or novel in structural design. Some record of the costs and economies of various solutions to a particular problem would be useful. Even if they were not applicable to the particular problem on hand they would at least stimulate investigations into structural economies on a sounder basis.

How, then, can we achieve steel economy? We can choose the suitable structural technique, reduce the weight of the structure by using lighter materials or by the architectural design.

The architectural design aspect is by far the most important factor, and the saving in dead weight by the use of lighter material is the next important, especially as far as the architect is concerned, whereas choosing a suitable structural technique is a factor more important to the engineer, although these factors, too, are linked to the architectural design aspect because they are dependent on the spans involved and the depths of the members.

There is no doubt that the architect is all important in this question of steel economy. If the original conception of the building is bad from the structural aspect, then no amount of skill on the part of the engineer can remedy it, although, of course, he can minimize it. The architect also has control of the construction to be used, and light-weight materials should be used to save dead weight wherever possible, and, at the same time, improve the thermal insulation. Although collaboration with an engineer is important from the earliest stages of the work, I consider that the initial conception of the building should be in the hands of the architect, except, of course, the more structural type of building, such as industrial buildings. In order to do this the architect must be equipped with a basic knowledge of structural design in the broadest sense in order that he may choose the structural technique appropriate to the building. After the initial sketch design, the engineer should then commence to collaborate and the final sketch plans should be a joint effort.

In order to assist the architect in selecting the suitable structure, there is room for more intimate collaboration between the two professions and the larger firms may find it worth while to engage an engineer permanently, or at least a consulting engineer on an annual retaining fee basis for the general work in his office.

The unfortunate thing about collaboration between architects and engineers is that in most cases there is a definite rift between them. This could be remedied by both architects and structural engineers having the same basic education, with a gradual development depending on the aptitude of the person. The joint basic education should be in the study of economics, material, structural forms, techniques in the creative sense and structural design. The present structural education for architects is, in most cases, entirely wrong and results in architectural students becoming confused and having a narrow outlook on structural techniques. It is no use being taught how to design structural members without a good idea of how to use them structurally.

The client, too, has a responsibility in this matter, especially when most of our clients these days are public bodies. Too much work is always required to be done in a hurry; some years ago, when little building work was being carried out, some of the schemes now proceeding could have been given to the architect, to enable more thought to be given. Some local authorities even now do not generally permit an architect to engage a consultant, and the architect is consequently in the hands of firms of constructional engineers without that intimate collaboration which is so essential for design.

Some firms, of course, are quite suitable for the design and execution of structures, but most of them are very traditional in their approach and often design for their own methods instead of showing enterprise. In any case, the clients pay in the long run as design overheads have to be borne by someone. The design staffs of constructional engineers in continental firms are often used to design structures in direct competition with other firms, and this has stimulated economic design and the use of new methods. In any case there are enough of the day-to-day purely constructional jobs which can be left in their hands.

The question of the engineer's fees is one which I feel needs some explaining, because he is usually paid a percentage of the cost, in the same way as an architect. Is this a satisfactory method when we are striving to save steel and cut costs? I am not suggesting that my professional friends are influenced by any consideration in this respect, but it might be a little unfair for an engineer to be involved in a tremendous amount of analytical design to achieve a saving in steel and a cut in his fees.

Perhaps he ought to have some form of fixed fee based on traditional methods. Naturally, if the architect provides for a lot of structural repetition, in the form of units or bays, the engineer can afford the time to carry out fuller structural investigations into each unit. I do think that this fee problem is one which needs looking into for consulting engineers.

From the research point of view, whilst there is a lot of fundamental work going on there does not seem to be an adequate means for engineers and architects to become aware of it. In any case, research is not integrated in the right way. Investigations into thermal insulation are not necessarily coupled to weathering problems

or to the fact that structural savings are achieved by using a lighter material. Furthermore, there is an undue lapse of time before the results of research are incorporated into codes of practice and bye-laws. It should be possible for working committees to issue addenda when deemed necessary.

Lastly, there is not enough material available on structural economy. Records should be collected and published in an annual calendar of types of structures used, with their costs, time used, and materials consumed. Even a simple retaining wall has many solutions, each using different quantities of materials, and the structural frame could be analysed in the same way showing how the steel content varies with the spanning of columns. A lot of this work could be done quickly and should be commenced so that both architect and engineers can base their economy on fact.

I feel so strongly about this, that efforts should be made on behalf of both professions to publish this work in an authoratative way, as a very practical step towards achieving economical design.

DISCUSSION

Mr. A. G. MacDonald [*F*]: When we are trying to decide the structural form or the structural materials that we wish to use in our shapes we think of going to our engineer friends, and we feel that we must get their advice on the matter, but then the wretched question of a fee comes up—can we put it to our client that a fee is necessary, or can we squeeze out of our own fee enough to pay our colleague for some very valuable advice that we expect to receive from him? I have been speaking rather facetiously, but at heart it is quite a serious matter, and one which we architects have to face. We have to be very brave and very courageous and to tackle the matter with our clients.

I was delighted that the lecturer mentioned the Architectural Science Board. We are now getting people to realize that light-weight in a building counts for something. We are now getting a new approach, and we are also being forced into a new approach because of the economic state of the world. We can not just go on as we used to do.

The matter of craftsmanship is very important. We architects come here, listen to lectures and discuss things, but we have to go outside and inspire people to be craftsmen by being craftsmen ourselves in the first instance. The lecturer said that the design of the building in proper form was the greatest method of economy. To my way of thinking, that is all part and parcel of craftsmanship.

Mr. J. Mason, A.M.I.C.E.: I should like to make one point with regard to stresses. Although by increasing the stress in building from 8 tons to 10 tons in the terms of Ministerial records a saving of 25 per cent was made in steel, that is not a very fair way of looking at the matter. The building which was put up at 8 tons had a greater capacity for carrying load than the building which was designed at 10 tons. The economy has been made at the expense of what the building carries. The same job has not been got with 25 per cent less steel; what has been obtained is a 25 per cent less job for 25 per cent less steel. I suggest, therefore, that one has to be cautious about referring to this as economy without realizing what it represents.

On the question of economy of design, properly so called and not the apparent economy of simply working to higher stresses, one can have economy piece by piece or one can have economy in the conception or in the shape.

There has to be division of functions of the engineer and the architect to a certain extent, but I take it that the aim is to minimize that division. With a job like Sydney Harbour bridge the difficulty with which is very largely in the construction, I take it that the priority must necessarily be towards the construction side. With a multi-storey building or a cinema, which is well within the capacity of the steelwork engineer to do with a large margin of variability on depth of beams and so on, I take it that the priority is in favour of general architectural treatment. Although the purely structural design in that case should appropriately take a second priority, if it can be stepped up by being integrated into the architectural treatment by using an appropriate material and an appropriate shape, then an enormous economy is made from the very beginning.

I should like to point out the increasing complication which is developing in structural work. Instead of having a beam which is a unit entirely by itself we are now getting rigid frames welded together, and strictly speaking every member and every load in the whole of the frame has its effect on every other one, although I agree that when the other members are remote the effect becomes very small.

Like the lecturer, I am a member of the Professional Institutions Committee for Steel Utilization, and one of the things that he and I are struggling for on that Committee is a handbook, which for convenience may be described as following the lines of the *Stahlbau Kalender*. As the lecturer pointed out, it is not always possible on every job to make that exhaustive study of what would be the best form or the best relationship of span, and so on, which one would like to do. Sometimes it is a question of cost; sometimes it is a question of time. If this information could be collected together into a handbook in a general way and presented in that form I think it would be of enormous advantage both to engineers and to architects, and it would contribute towards that integration of function which the lecturer has recommended this evening.

Mr. F. J. Samuely, A.M.I.C.E., M.I.Struct.E.: There is one point which I feel is very important when one talks about economy. It is the question, 'Is the economy really desirable, or do we just accept the fact that we have to economize on steel as such?' I think there are three different cases. We may economize on steel and may find that it is a real economy. We may economize on steel and may find that it is not a very great economy, but that we have to some extent saved using a material that is in scarce supply. We may economize on steel and in effect spend a lot of money unnecessarily. I am particularly afraid of this third case arising.

One very easy way of saving steel in buildings is to reduce the spans. That is a great danger. I feel that even before the war, when steel was not particularly scarce, there was a tendency, more obvious in this country than in other parts of the world, to save steel unnecessarily, to produce short spans and lower building costs, but at the expense of the building as a whole, including very much higher running costs.

To put the point briefly, it is really in education that one can start doing something by way of saving. As long as architects rely on the collaboration of engineers I do not think they can get really to the root of the problem. It is necessary that the architects should know in principle what the structure is doing and what it has to do. They can know that only if economy is properly taught in the schools. Only when that is done can saving be done in the right place.

Mr. Cecil Kennard, F.R.I.C.S., M.I. Struct.E. [*F*]: In London we are now dealing with the question of stress in steel and reinforced concrete through bye-laws, and those bye-laws are in process of revision. That revision was first proposed, I believe, in 1942; we are now in 1949, and I imagine we shall be in 1951 before any revised bye-laws become operative. This means that, as far as progress in design is concerned, there is a time-lag of nine years. I submit that in the modern world that is an impossible situation. If we are to have the economy which we are seeking, obviously the legislation must try to keep pace with research, in which fine work is being done to enable better use to be made of material.

The time-lag means, moreover, that when we get the new bye-laws they will probably be out-of-date. The whole process will then have to be started all over again.

Mr. Leonard Michaels [*A*]: As Mr. Samuely said, closer collaboration between architects and engineers is an important factor, but I agree with him that in the long run it will not produce real results from an architectural point of view. Going back and forth from architect to engineer does not permit the architect's creative function to operate. The architect must know in his mind what can be done and what can not be done, and in order to know that he must understand all the principles involved in the structure and must keep himself currently informed of developments in regard to structural materials.

The question of looking for economy as a result of economic necessities is very much tied up with the whole development of architectural design, and particularly our contemporary architecture, because the whole of architectural design in the past has developed very much out of an understanding of the materials being used.

Review of Construction and Materials

This section gives technical and general information. The following bodies deal with specialized branches of research and will willingly answer inquiries.
The Director, The Building Research Station, Garston, near Watford, Herts. Telephone: Garston 2246.
The Director, The Forest Products Research Laboratory, Princes Risborough, Bucks. Telephone: Princes Risborough 101.
The Director, The British Standards Institution, 28 Victoria Street, Westminster, S.W.1. Telephone: Abbey 3333.
The Director, The Building Centre, 9 Conduit Street, W.1. Telephone: Mayfair 8641-46.
The Director, The Scottish Building Centre, 425-7 Sauchiehall Street, Glasgow, C.2. Telephone: Douglas 0372.

Double Glazing. In considering the chain of circumstances that lead to bad thermal insulation in buildings it will probably be found that one of the weakest links is the window. We build cavity external walls, apply insulating material elsewhere, and then leave the window area open to the external air except for a thin sheet of glass which, under good conditions, has a transmittance value of 0.70, and 1.30 for exposed positions.

Post-war Building Study No. 19 refers to heat losses through windows, and mentions the benefit of double glazing or double windows, and Messrs. Pilkington Bros. have now produced a practical solution with their Insulight double-glazed unit. This consists of two sheets of glass kept $\frac{1}{4}$ in. apart by a small channel-shaped copper spacing frame. The $\frac{1}{4}$ in. space is filled with dried air and the sheets are hermetically sealed to the frame, so that condensation on the inside of the sheets is eliminated, which is not the case with the double sash form of double glazing.

Although the unit does to some extent reduce the transmission of sound, its main purpose is to lessen heat losses, and for an open fireplace living-room with a window of 20 sq. ft. the makers estimate a saving in fuel costs of £4 a year in the north of England and £3 in London, and point out that larger windows can be used in a house without excessive loss of heat, as the transmittance value of the unit ranges from 0.47 to 0.65 according to the exposure conditions.

Inquiries should be addressed to Messrs. Pilkington Bros., Ltd., St. Helens, Lancashire.

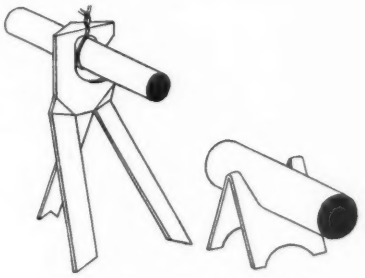
Reinforcement. Of the many things likely to give an architect an uneasy feeling the placing of reinforcing rods in in-situ concrete is surely one, however accurate his drawings and definite his specification. The usual stipulation is that the cover shall be $\frac{1}{2}$ in. or the diameter of the bar, whichever is the greater, but theoretical calculations can be upset by incorrect placing of the rods on the job. The bottom rods of a beam are often supported on bits of concrete, but with varying thicknesses of rods these supports should properly be of varying thickness.

The situation is worse in the case of top reinforcing rods, for here the cover must extend downwards from the top surface of the slab, that is, from a surface which does not exist until the concrete has been deposited.

All these difficulties have been overcome by the 'Besserfix' series of supports and spacers, which are made from sheet steel. The basis of the design of these supports is the specially-shaped slot, which automatically adjusts the cover to suit the different diameters of the rods. There are four types: B, for supporting the bottom rods in slabs and beams; C, for columns; T, for top reinforcement up to $\frac{3}{4}$ in. diameter in slabs; and W, for vertical reinforcement in walls and deep beams.

Types B and T are illustrated here, and a glance at type B will show that the thicker the rod the higher it will sit in the slot, while in type T the thicker bars will sit lower in the top slot. Various sizes are made to suit different thicknesses of slabs or beams.

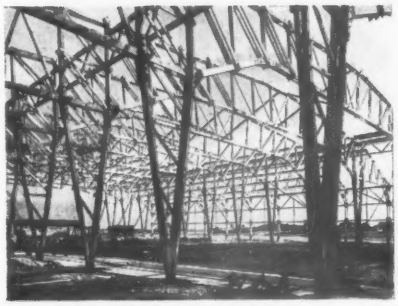
These Besserfix supports are obtainable from the British Steel Reinforcement Co., Ltd., of 20 Harcourt House, 19 Cavendish Square, London, W.1.



Besserfix reinforcement supports

A Timber Design of Today. For some time past the Timber Development Association have been advocating, as a national policy in relation to the dollar problem, the scientific use of timber for structural purposes. They have backed up their theory with a practical demonstration of possibilities by designing a timber-framed shed at Shoreham-by-Sea for a firm of timber merchants, Messrs. Beves and Co. It is the largest industrial building of timber constructed in this country since the war, having a floor area of over half an acre.

The framework consists of 13 main transverse frames, at 15 ft. centres, connected together with longitudinal stiffening lattice girders and carrying purlins which support the asbestos-cement cladding. The


Timber-framed shed at Shoreham

design is based on three basic considerations. First, the application of structural theory instead of the old rule of thumb methods which hitherto have been used almost entirely for the design of timber structures. Second, and a necessary corollary to the first consideration, improvements in selecting timber having specific strength properties, in this case selected Douglas fir graded for working stresses of the order of half a ton per sq. in. Third, improvements in methods of jointing. The joints are assembled with split-ring and 'Bulldog' connectors, bolts and plates in accordance with rules determined in the laboratory, the loads being computed according to the relevant Code of Practice.

The structure is designed to sustain its own weight, plus that of a 2 ft. snow layer and a wind velocity of 75 m.p.h. The 'legs' of the frames, together with cantilevered portions on either side, were assembled on the ground and hoisted to a vertical position. The central lattice members were then hoisted and bolted up to the cantilevered portions on either side. It says much for the accuracy of the workmanship by the contractors, Messrs. J. W. Ridge, Ltd., that these centre sections exactly fitted the bolt holes on the cantilevers.

The foundations are of reinforced concrete. The feet of the timber columns are supported above the floor, the external columns being carried on precast concrete posts and the (main) internal columns on short lengths of r.s.j. embedded in the concrete. The largest timber section in the main frames is 2 in. by 8 in., in the purlins 2 in. by 10 in., and in the supports 4 in. by 6 in. The total timber consumption is just under one standard per 1,000 sq. ft. of covered area, and the final cost of the whole building was 6s. 9d. per sq. ft.

Short Concrete Piles for Foundations on Shrinkable Clays

By N. Davey, D.Sc., Ph.D., M.I.C.E. (Bld. Res. Stn.)

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ATTENTION has already been drawn in the JOURNAL[1] to some of the problems associated with the erection of buildings, particularly houses, on shrinkable clay. Such clay, although it may have adequate load bearing strength, dries and shrinks in summer and swells in winter, owing to changes in its water content, the effects being, of course, more pronounced near the ground surface. If, therefore, the foundations of buildings are not deep enough there is a serious risk of uneven settlement and consequent cracking of the walls. In recent years, and particularly during the dry summer of the present year, very many buildings have suffered serious damage. Repair is often difficult and costly, and unfortunately unless drastic measures are taken, the damage may recur. The incidence of trouble has been most marked in the south of England where a large part of the area is covered by such clay deposits as those known geologically as Woolwich and Reading, London, Gault, Weald, Kimmeridge, Oxford, Lias and the glacial drift clays of East Anglia. Clays with similar characteristics are less common in the north of England, although they may occur, for example, on the surface of the carboniferous shale beds.

It is important in such areas, as a safeguard against possible damage to new buildings, to carry all external wall footings to a depth of at least 3 ft. However, in view of the probable difficulty in some sites of excavating the deep narrow trenches required, it may prove more economical to use short bored piles to support the walls. The method is not new, but there is as yet no generally accepted theory for estimating the bearing capacity of such piles from the physical properties of the clay alone. A programme of direct loading tests on piles of varying diameter and length in different types of clay was therefore undertaken by the Building Research Station with assistance from the Ministry of Works. As a result, safe values for the bearing capacity of piles in such clays can now be given. Two sites for the loading tests were selected, one with clay varying from 'stiff' near the surface to 'hard' deeper down, and the other from 'firm' to 'stiff'. The terms 'firm', 'stiff', 'hard', etc. are those used at the Building Research Station to define clays of varying strength as indicated in Table 1.

[1] W. H. Ward. *House Foundations.* Journ. R.I.B.A., Feb. 1947.

Fig. 1: Manual earth auger

Fig. 2: Mobile mechanical earth auger

TABLE 1

Class of Clay	*Unconfined Compression Strength—lb./sq. in.*
Very soft	Less than 5
Soft	5 to 10
Firm	10 to 20
Stiff	20 to 40
Hard	More than 40

The first site was at Garston, where, below a top layer of soil 1 ft. thick, the subsoil material was 'stiff' brown boulder clay with some chalk nodules, followed at a depth of about 5 ft. by 'hard' mottled grey-brown clay with flints. The second site was at Hendon, and was generally softer than that at Garston, and consisted of about 1 ft. of top soil followed by 'firm' brown clay overlying 'stiff' blue clay to a great depth. Loading tests were carried out on piles of 10, 12 and 14 in. diameter, and varying in length from 8 to 12 ft. As the load was increased from zero, the settlement was slight and increased only gradually. After reaching a value approaching ½ in., however, the settlement took place more rapidly, the clay definitely yielding. The safe bearing load in tons, recorded in Table 2, was therefore taken as one-half the load which produced this ½ in. settlement. Under such a bearing load the settlement in no case exceeded $\frac{1}{10}$ in.

Some of the piles at Garston and Hendon were subsequently reloaded after a lapse of a month or so, and appreciable tightening-up was found, the piles almost invariably carrying more load than they did on the initial test.

Fig 3: Hopper device, preventing soil from falling into hole

On a new site it will be necessary first of all to determine the type of clay. Experience on other sites may enable this to be done broadly by visual examination of samples of the clay, but a more certain approach would be to have undisturbed samples taken from different depths and tested in unconfined compression; then by reference to Table 1 the classification can be checked. Having determined the general

TABLE 2

Safe bearing capacity in tons of short bored piles, based on actual loading tests. (Taken as one-half the load which produces a settlement of one-half an inch)

Type of clay	Length of pile—ft.	8			10			12		
	Diameter of pile—in.	10	12	14	10	12	14	10	12	14
'Firm' to 'stiff'		3½	4¾	5½	4¾	6	6¾	6	7	8
'Stiff' to 'hard'		6	8	8½	9	10	10¾	No test data available		

Note.—For practical purposes only two types of clay need be considered, 'firm' to 'stiff', and 'stiff' to 'hard'. Sites where the clay is 'soft' or 'very soft' should be avoided.

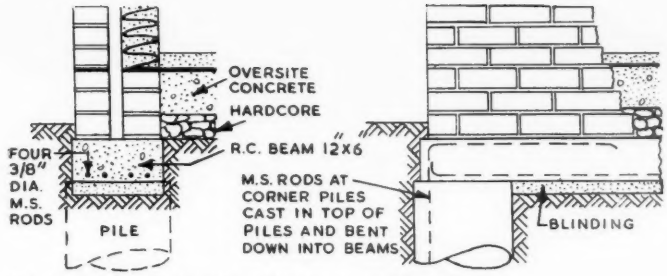
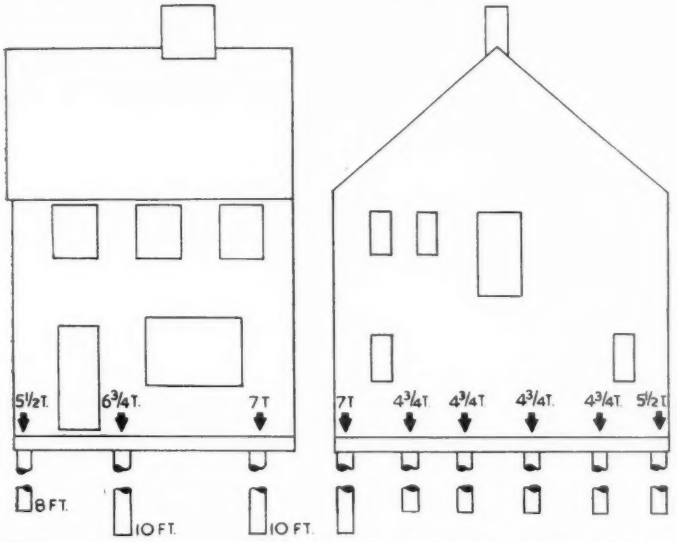

OVERSITE CONCRETE
HARDCORE
R.C. BEAM 12"X6"
FOUR 3/8" DIA. M.S. RODS
PILE
M.S. RODS AT CORNER PILES CAST IN TOP OF PILES AND BENT DOWN INTO BEAMS
BLINDING

Fig 4. Section and elevation of in-situ supporting beam



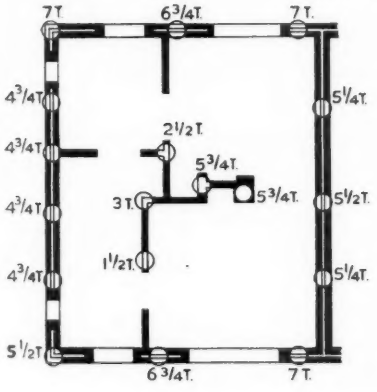


Fig. 5: Typical arrangement of piles. Left, plan. Above, elevations

type of clay, whether 'firm' to 'stiff' or 'stiff' to 'hard', the appropriate size of pile can be selected from Table 2. Sites on which the clay is 'soft' or 'very soft' should be avoided. The unconfined compression is quite simply carried out either in the laboratory, or on the site with a small portable compression machine.[2]

In order to obtain an estimate of the cost of the method a time study was carried out on over 300 boring operations at four sites, at Hendon, already mentioned, at Barnet where the subsoil was 'stiff' glacial clay with flint gravel; at East Barnet, 'stiff' to 'hard' glacial drift clay with flints; and at Headstone Lane, 'stiff' glacial drift clay with thin seams of flint gravel. In all, a detailed time study was made of the boring operations for 340 piles. The time for two men hand-boring on the clay sites at Hendon and East Barnet in the manner shown in Fig. 1 varied from 3.6 to 6.6 minutes per foot depth. At Headstone Lane the presence of gravel seams resulted in longer boring times—varying from 6.3 to 8.5 minutes per foot depth. It was found in this instance that it was quicker to bore with a 14-in. auger than with smaller ones, the larger auger being better able to clear the gravel. It was also observed that it took about three times as long to bore through a gravelly stratum than it did through the clay.

The average times for machine boring (including manœuvring time) using a mobile earth auger developed by the Ministry of Works[3] and illustrated in Fig. 2 on the clay sites at Barnet and East Barnet were 2.0 and 1.8 minutes per foot depth respectively. The time was longer at Hendon, where the occurrence of claystones doubled the time for boring. In consequence the rate recorded was 3.8 minutes per foot depth. The machine employed two men, and the time to mix and place concrete in a 14 in. diameter hole 7 ft. deep was observed at Barnet to be 13 minutes. This was for a 4-man team operating a 5/3½ cu. ft. mixer. It is evident, therefore, that a total team of 6 men can bore by machine and fill with concrete four holes of this size per hour, or the 28-30 piles required for a semi-detached pair of houses in 7 working hours. Two hand augers replacing the machine would do this work in about the same time. This would involve 8 men instead of 6. It is evident, therefore, that the machine must not cost more than 2 men's wages.

Fig. 3 shows a simple hopper device which greatly facilitated the placing of the concrete and prevented soil from falling back into the hole.

In most cases floors and walls can be supported on peripheral beams, cast in-situ, spanning between the pile heads. The exact calculation of the size of beams required, however, is not readily possible since the distribution of loads along them is not known sufficiently accurately. The reason is that the brickwork above the supporting beam itself acts as a deep beam, and 'arching' of the load results. This tends to concentrate the load more at the beam supports—or pile heads, than at the centre of the beams. It was necessary, therefore, to undertake a series of loading tests on typical sections of wall, some with a window opening, others with a door opening in order to determine more precisely the magnitude and distribution of load along the supporting beam. As a result it was found that a supporting beam of concrete 12 in. wide, 6 in. deep, reinforced with four ⅜ in. diameter mild steel rods would be adequate for two-storey structures provided the clear span did not exceed 11 ft.

In practice one method is to cast the supporting beams in-situ in shallow trenches dug along the lines of the finished piles as shown in Fig. 4. Before concreting, a layer of clinker or 'blinding' concrete 1 to 1½ in. in thickness should be laid. The steel reinforcement should be laid so that it has 1 in. of cover. As an alternative to mild steel rods, steel fabric may be used with an equivalent cross sectional area. In addition, similar steel should be inserted 1 in. below the upper surface of the concrete immediately over the pile head, and extending each side as far as the quarter span points.

The arrangement of piles shown in Fig. 5 illustrates one way in which the method can be applied to a fairly common type of construction. The magnitude of the load in tons on each pile is indicated. Other arrangements can be worked out to suit individual requirements.

Reports on the technical aspects of the investigations carried out at the Building Research Station are being prepared for publication. This paper is published by permission of the Director of Building Research.

[2] L. F. Cooling and H. Q. Golder. *Portable Apparatus for Compression Tests on Clay Soils.* Engineering, Jan. 19 1940.

[3] *A Mobile Earth Auger.* The Contract Journal, May 4 1949, p. 126.

Practice Notes

Edited by Charles Woodward [*A*]

MINISTRY OF TOWN AND COUNTRY PLANNING. The Minister has issued a Direction under Article 9 of the Town and Country Planning (General Development) Order, 1948, providing for consultation by Local Planning Authorities in respect of applications for development in the neighbourhood of an existing or prospective airfield or flying boat base. The Direction applies to similar development in similar areas to those specified in previous Directions, which it now replaces, and may relate to airfields not at present in use, but which may be needed in certain circumstances.

The consultation referred to is with the Air Council, the Lords Commissioners of the Admiralty, the Minister of Supply or the Minister of Civil Aviation, through the appropriate officer specified on a 'safeguarding map' which is a map certified by the Minister to be the safeguarding map for an airfield. Where no safeguarding map has been furnished to the Local Planning Authority, it must, before granting permission for the development specified in the Direction. consult with the Local Superintending Engineer of the Air Ministry or in the case of naval airfields, the Chief Surveyor of Lands, Admiralty.

The Direction safeguards buildings in existence at the date of the Direction, 14 October 1949, provided that in rebuilding or altering such buildings the maximum height is not exceeded nor the total floor space nor the ground floor space of the original building is increased by more than one quarter. Otherwise, consultation is required in respect of the following:

All excavations on the airfield or within 1,000 yards of the perimeter.

All dwelling-houses, all other buildings, all works exceeding 10 ft. in height, and deposits of waste material exceeding 10 ft. in height, either on the airfield or within 2 miles of the perimeter.

All buildings and works and deposits of waste material exceeding 35 ft. in height and which are more than 2 miles and less than 3 miles from the perimeter.

Compact settlements having a population exceeding 500 people are excluded providing the proposed development does not exceed the general height of buildings in the vicinity.

(Town and Country Planning (Airfields) Direction, 1949, B.3735, obtainable at H.M. Stationery Office, price 3*d.* net.)

A Circular, No. 76, has been issued to local planning authorities by the Ministry of Town and Country Planning in connection with the Direction.

ARCHITECTS' COPYRIGHT IN DEPOSITED PLANS. In connection with drawings deposited with Authorities under Bye-laws or the Town and Country Planning Acts, the question arises as to what rights of access there are to such drawings. In the opinion of the Royal Institute's Solicitor the position is as follows:

Normally the copyright in plans (as distinguished from the actual plans themselves) remains the property of the architect. Subject to payment for the work of preparation the client is entitled to delivery of the plans and by implication has licence to erect one building in accordance therewith, irrespective of whether the original architect is employed to supervise the erection.

The implied licence above referred to covers also the use of the plans for the purpose of obtaining approval or permits to erect the building. As the client is entitled to possession of all drawings subject only to the architect's lien for unpaid fees (if any) no reason is known why the client or his duly authorized agent should not have access to the deposited plans. Normally when a property passes from one owner to another the transfer would by implication cover the ownership (as distinct from copyright) of the plans from which the building was erected, so that such subsequent owner is entitled to access to deposited plans.

LAW CASE. Crisp from the Fens, Ltd. v. Rutland County Council. This case was an appeal by the plaintiffs by way of a case stated by Rutland Justices and was heard by a Divisional Court of the King's Bench Division on 20 July 1949.

The appellants, a company manufacturing potato crisps, acquired premises and obtained from the respondents, as local planning authority, permission under sections 12 and 14 of the Town and Country Planning Act, 1947, to change the use of the premises by manufacturing potato crisps there subject to the condition that the use of the building should be confined to the manufacture of potato crisps or any use within Class III of the Town and Country Planning (Use Classes) Order, 1948. The reason stated for imposing the condition was to ensure that the building would not be used for general industrial purposes, as such uses would be liable to be detrimental to the amenities of the locality.

Manufacture of potato crisps having begun on the premises, the local planning authority served notice under section 23 (1) of the 1947 Act that the condition had been broken in that the company had caused detriment to the amenity of the locality by causing smell, noise and smoke contrary to the definition of use of a light industrial building as defined by Class III of the Order of 1948, and requiring the company to discontinue the use of the building for the manufacture of potato crisps or any use which did not comply with the condition imposed by the permission. The company appealed to the Justices against the notice which was dismissed, the Justices finding that smell, noise and smoke were, in fact, emitted.

The company appealed to the Divisional Court on the ground that as the wording of the condition was in the alternative ('the manufacture of potato crisps or any use within Class III of the Order of 1948') the manufacture did not infringe the condition even if it was not within Class III, which is 'use as a light industrial building for any purpose', and 'light industrial building' is defined in the Order, *inter alia*, as an industrial building in which the processes carried on are such as could be carried on in any residential area without detriment to the amenity of that area by reason of noise, smell, fumes, smoke.

The Court held, by a majority, that the proper construction of the permission was that the reference to Class III governed also the manufacture of potato crisps, so that permission to manufacture potato crisps was given subject to that manufacture being within Class III with the consequent preservation of amenities.

The dissenting Judge said that the clear interpretation of the permission was that the company were allowed to manufacture potato crisps or, if they did not want to do that, to put the premises to any use falling within Class III of the Order of 1948. If the intention of the authority had been to authorize the manufacture of potato crisps provided that it should cause no detriment to the amenities of the area, it would have been more obviously expressed.

The appeal was dismissed. (From THE ESTATES GAZETTE, 22 October 1949.)

MINISTRY OF HEALTH. Circular 92/49 dated 4 October 1949, states that the revision of the Model Series of Building Bye-laws is proceeding, but that it will be impracticable to complete the work and to issue an up-to-date Model Series before 31 December 1949, the date on which existing building bye-laws will, unless further extended, lapse.

The Minister proposes, therefore, in the exercise of of his powers under the proviso to section 68 of the Public Health Act, 1936, to make a further Order extending until 31 December 1950 the period during which the bye-laws, now operative, will remain in force. A copy of the appropriate Order will be forwarded to each Authority in due course.

MINISTRY OF WORKS. Advisory Leaflet No. 2, 1949, has now been issued by the Ministry. It is entitled 'Plasters used in Building', and is obtainable at H.M. Stationery Office. These leaflets are designed mainly to meet the needs of the small builder, clerk of works, foreman and craftsman for information in a practical and convenient form about the results of research and the latest developments in building practice.

BUILDING MATERIALS. The Minister of Works has decided that on grounds of economy and in view of the improved supply of building materials the Site Assistance Scheme can be discontinued from 1 November 1949. Under this Scheme, Regional Officers of the Ministry of Works have been arranging the supply of materials to particular building sites when continuity of work appeared to be threatened by shortages. (M.o.W. 133/49, P.I.2950, 25 October 1949.)

Book Reviews

Mechanization Takes Command, by *Siegfried Giedion.* 9¾ in. xiv + 743 pp. text illus. New York: Geoffrey Cumberlege, the Oxford University Press. 1948. £2 10*s.*

Dr. Giedion describes this work as 'a contribution to anonymous history', and it is a book that brings into coherent relationship many apparently unrelated matters. The humble objects which are examined in the various sections have collectively 'shaken our mode of living to its very roots'; and the cumulative effect of the changes caused by the mechanization of many forms of activity is not fully apprehended by those who derive benefit, danger, or irritation from them. Dr. Giedion brings into focus many diverse views and theories that have been expressed and accepted about the manifestations of mechanized industry; much in the same way that Darwin in the mid-19th century brought into focus many views and theories about natural history that had hitherto gained fragmentary acceptance.

The impact of Darwin's conclusions profoundly shocked his contemporaries: the impact of Dr. Giedion's is less abrasive to established thought, for he shows that evolution is as potent a force in the inorganic mechanism which man has invented, as it is in organic life. A century ago this book would have horrified nearly everybody; but a century ago it could not have been written, because mechanization was then in the 'ape man' stage of evolution —the 'Rocket' was the *pithecanthropus erectus* of locomotives—and it is still far from complete.

Using the technique of Lewis Mumford, without resorting to that sociologist's ponderous phraseology, Dr. Giedion can examine a matter exhaustively, without exhausting the reader. His book consists of seven sections, with a final section, labelled 'Man in Equipoise'. The important sections are:

II. Springs of Mechanization.
III. Means of Mechanization.
IV. Mechanization Encounters the Organic.
V. Mechanization Encounters Human Surroundings.
VI. Mechanization Encounters the Household.
VII. The Mechanization of the Bath.

Section V records the growth and changing conceptions of comfort, from mediæval times to the 19th century; and in tracing the evolution of various types of furniture, and the transition from handicraft to mechanical production, Dr. Giedion has written a history of furniture with new vision. (Gordon Logie, A.R.I.B.A., made this fresh approach to the subject in his *Furniture from Machines*, 1947.) Dr. Giedion's book is erected upon a plinth of research and scholarship, and it should make some contemporary enthusiasts for modern design rather humble (if they are capable of entertaining that virtuous emotion) for many of the designs that have, during the last twenty years, been reverently saluted for their proud independence of tradition, are based upon some early or mid-Victorian prototype. Continuity in design appears to be inescapable: and this is demonstrated by the recent history of furniture; particularly by the development of patent and convertible furniture which, occupying Section V, is comprehensive and most illuminating.

The book contains 501 illustrations in the text, in line and half tone. Nearly all are well chosen and apposite; but the vile brutality of illustrations 128 and 129, which appear on page 245, are revolting; and their inclusion in a book of this sort is incomprehensible. Surely Dr. Giedion could have confined to the text that description of the hideous shot in Louis Bunuel's film, *Le Chien Andalou.* He gives all the details about this piece of diseased imagination on page 242: those two illustrations are redundant and nauseating.

The description of the mechanized breeding and butchery of animals for food is a little too enthusiastic. Possibly Dr. Giedion feels that his treatment of the subject is justified by his conclusion that 'Perhaps the most appealing side of this research appears in its deeper penetration into the habits of animals and the regulation of their living conditions accordingly. Given the opportunity, the pig expresses the same desire for cleanliness as a cat or a man.'

This seems glaringly obvious to anybody who knows anything about animals; but, throughout, this book reflects a tendency of our century, which is to think in mechanical rather than in natural terms. The title suggests how far we have travelled along the road that Samuel Butler foresaw, when, in Chapter 24 of *Erewhon,* he asked: 'May not man himself become a sort of parasite upon the machines? An affectionate, machine-tickling aphid?'

Those three words, '*Mechanization Takes Command*', suggest an acquiescent acceptance of the machine as a master. It is odd that Dr. Giedion should have chosen it, particularly as, in his final section, he discourses 'on the illusion of progress', and says: 'We are confronted with a great scrap heap of words and misused symbols, and next to it an enormous storehouse bursting with new discoveries, inventions, and potentialities, all promising a better life.

'Never has mankind possessed so many instruments for abolishing slavery. But the promises of a better life have not been kept. All we have to show so far is a rather disquieting inability to organize the world, or even to organize ourselves. Future generations will perhaps designate this period as one of mechanized barbarism, the most repulsive barbarism of all.' But as a corrective to that pessimistic prophecy, we may recall the resounding common sense of that great Englishman, Dr. Samuel Johnson, who once said: 'It is the nature of man to imagine no evil so great as that which is near him.'

JOHN GLOAG [*Hon. A*]

The Social Background of a Plan. A study of Middlesbrough. *Ruth Glass*, ed. *Association for Planning and Regional Reconstruction.* (International Library of Sociology and Social Reconstruction *series.*) 8½ in. xiv + 268 pp. 21 maps in pocket. Routledge. 1948. £2 2*s.*

This volume is a part of the extensive researches which made up the Middlesbrough Survey and Plan; it contains an account of the pattern of neighbourhoods, the health services, the education services, the retail trade and an essay on the relationships of the survey to the plan. A very substantial and competent appendix by Mr. A. E. Smailes, a geographer who has specialized in planning problems, gives an account of the geographical and economic background.

The main interest of the volume is in the two essays, 'Patterns of Neighbourhood', and 'Survey and Plan', because they are about the contribution of the sociologist to town planning. The appreciation of this aspect of the work is handicapped by two major omissions. The first is a clear statement of the objectives of the planning, apart from fulfilling the statutory requirements, and, secondly, a demonstration of the precise influence of the social research on the plan which could with advantage have been printed in this volume.

Some of the purposes of the social survey are described by Mrs. Glass in her final essay, 'The Technical Purpose of the Survey', and these include that of delimiting social boundaries which are to 'determine proposals of realignment and regrouping'. Mrs. Glass's analysis of the neighbourhood structure of Middlesbrough is unlike any previously attempted. Her definition of neighbourhood derives mainly from indices which are aspects of economic status and appear to have been chosen for their availability rather than as the requirements of a hypothesis to be tested. They include rateable value, age of buildings, type of housing, number of habitable rooms per dwelling, and, amongst others, head infestation of school children. Most of these indices and the supplementary indices employed correlate very highly with each other, and it is difficult to understand why they were all employed. The 'neighbourhoods' thus identified were adjusted arbitrarily to census enumeration districts in order to obtain population data, and attempts were made to discover the extent to which these areas were also areas in which there were common institutional activities, but with negative results. Mrs. Glass then went on to grade the neighbourhoods she had established according to their living conditions, institutional equipment, neighbourhood integration and geographical demarcation. The institutional equipment was defined as the provision of elementary schools, post offices, surgeries, churches, clubs and public houses in proportion to the population. Here there is no very clear concept underlying the analysis. It may be argued that the presence or absence of a public house may affect the social life of any urban area, but it is hard to see how the absence of a post office or a surgery will affect the

social life, although it may give rise to inconvenience. Elementary schools are, on Mrs. Glass's own showing, not particularly important in creating social relationships, although nursery and infant schools may be. Thus it is possible to imagine the distribution of some of these institutions which would be convenient, but which paid no attention to the social neighbourhood boundaries described earlier. Again, unless institutions are classified more precisely, their significance is not obvious. Any number of Protestant churches would have no value to a Catholic family.

It is very hard to see the relevance of boundaries established on the basis of income to the planner's activity, as this classification tells us little or nothing about the patterns of friendship and social activity which are important to the mental health and social development of ordinary families. The placing of post offices and surgeries in relation to such boundaries may also sacrifice convenience to arbitrary tidiness.

This study makes a great point of the value of social research in estimating housing demand, but your reviewer doubts very much the value of this kind of research which takes no account of the economic factor in housing demand, nor forecasts the ultimate patterns of family life that would exist if housing were plentiful; it also ignores the effects of economic changes within the town as a whole. In that the plan is unlikely to be fulfilled in ten, or even fifty years, it may be thought that there was sufficient obvious demand to make possible the first stages of the programme without elaborate research of this kind.

It would be very helpful if Mr. Max Lock, Mrs. Glass and their collaborators could find time now to go back over this immense pioneering enterprise and develop the points made by Mr. Lock in his introduction, selecting what has been essential to the planning process and advising us in what fields further work is necessary.

DENNIS CHAPMAN

Murray's Berkshire Architectural Guide. Edited by *John Betjeman* and *John Piper*. 10 in. xii + 163 pp. incl. pls. + folding map, text illus. John Murray. 1949. 18*s*.

Mr. Betjeman's work is always charming: he has not only a genuine interest in architecture, but he is also a poet with great vitality and understanding. And the combination of Mr. Betjeman and Mr. Piper results in books of the utmost competence and polish—as with *Murray's Architectural Guide to Berkshire*.

But this book is more than a guide. For a start one could not wish for a more conscientious survey. Its annotated photographs cover every period of architectural history from early English to the present day. And a county which for me, at any rate, was not much more than a name suddenly becomes alive, amazingly real. Each place visited, studied, has the touch of personal interest, for the editors look at their buildings with an imaginative eye. They say themselves in their introduction: 'We still believe in the virtue of making clear our reactions to buildings and to towns and villages. We believe that houses do, and should, inspire love and hate. . . .' It is good to hear these things said in times of poor taste and indifference towards architecture. It is satisfying to know that there are still people who really understand the meaning of quality in design and in the use of materials. And it is pleasant to note the detail that has been collected in this book—the architectural foliage of great beauty, the placid 14th century tombs, the extraordinary complexities of 18th century gravestones: these are works of art that are not always appreciated by people interested in buildings. For another thing, the editors have discussed not only the æsthetics of architecture, but also the appreciation of function and setting which is necessary if one is really to understand the houses and churches that one looks at. The photographs are not, on the whole, particularly striking, but sometimes one does find one which recreates a building, or fixes a precise moment of a day or season—the superb elegance of Windsor Castle, the power of Lutyens's Deanery at Sonning or a house trapped in a heat-haze.

However, I am bound to admit that there is one flavour here which leaves an unpleasant taste in the mouth. It is a flavour which is not, I may say, limited to *Murray's Architectural Guide to Berkshire*. I refer to the present fashion in Victorian oddities, the romantic enthusiasm for 19th century nostalgia. It is easy to be enthusiastic about Gothic Revivalist churches, easy to be enchanted by their peculiar cottages or mad ruins: and it is for this reason that it is important to point out that it is equally easy to overstate the value of these witty or melancholy curios, to lose one's appreciation of what is good or bad or ugly, one's power to 'love and hate. . . .'

STEPHEN GARDINER [*A*]

The Mechanics of Engineering Soils, by *P. L. Capper* and *W. F. Cassie*. (Civil engineering series.) 8¾ in. 270 incl. xv. pp. text illus. E. and F. N. Spon. 1949. £1 1*s*.

While a great deal is known about the properties of most materials commonly used in building and civil engineering works, scientific information about the oldest construction material known to man, earth, is still rather limited. Most of this information appeared during the last two decades and has been published in numerous technical papers and some comprehensive books written for specialists on the subject of soil mechanics. It is therefore timely that a book such as this one has been written for the student and engineer who wants to learn something about the basic principles —soil problems and tests and their application to some common problems in practice.

The book opens with a brief survey of the development and scope of soil mechanics, in which the authors discuss briefly the standard classification and index property tests of the various soil types. The practical examples in the chapter on soil moisture are, however, restricted to sands and silts and no mention is made of the deterioration of clays in cuttings and excavations and its seasonal water content changes, which may cause appreciable movements of shallow foundations. After the very lucid treatment of compressibility and consolidation of fine-grained soils, the shearing resistance of the principal materials is considered in some detail, but the fundamental role of the pore water pressures on the strength has, unfortunately, been omitted.

The second half of the book contains many useful tables and diagrams for the determination of earth pressures and problems in connection with the stability of slopes and the bearing capacity and settlement of foundations. The many different methods for estimating earth pressures and bearing capacities may appear to be somewhat confusing to the student and could well be limited to those that are really important and applicable under all conditions as has been done in the case of roads and airfields.

The general stability of earth-retaining walls might also be considered in a second edition. Although the chapter on drainage problems covers a very wide field, the important seepage problems related to earth dams have not been treated but may be considered rather a special field.

This well-illustrated book presents a clear and concise picture of the subject as it now stands and can be recommended to all readers of this JOURNAL who wish to be introduced to a very fascinating subject.

G. G. MEYERHOF

A Companion to the Town and Country Planning Acts and Orders, by *Norman C. Abbey*. 7½ in. 286 pp. Eyre and Spottiswoode. 1949. 10*s*. 6*d*.

This work is described as a 'companion' to the Town and Country Planning Acts. It may be that one would rather have the 'companion' than the Acts, which would probably be the opinion of those who have tried to understand such complicated legislation. No doubt it will fall to His Majesty's Judges to decide what the legislature has said, and it does not at all follow that the legislature has said what it meant to say. Thus amending Acts come into being.

The value of this companion is that each chapter deals with a particular part of the Act, and the relevant Regulations or Orders made by the Minister in connection with that particular part are included in the chapter. Thus under 'Control of Development' the Use Classes Order, and the General Development Order will be found, together with an explanation of the sections of the Act relating to control. The ova are thus in one receptacle. Included in the volume are chapters dealing with the New Towns Act, the Distribution of Industry Act and the Licensing Planning Acts. There is a good index.

The book provides a general knowledge of town planning law written in ordinary language and should prove to be a useful reference. CHARLES WOODWARD [*A*]

Notes and Notices

NOTICES

Session 1949-50. Minutes 1

At the Inaugural General Meeting of the Session 1949-50, held on Tuesday 1 November 1949 at 6 p.m.

The meeting was attended by about 220 members and guests.

The Minutes of the Eleventh General Meeting of the Session 1948-49, held on Tuesday 21 June 1949, having been published in the JOURNAL, were taken as read, confirmed and signed as correct.

The President delivered his Inaugural Address of the Session.

On the motion of the Right Hon. Charles W. Key, M.P., Minister of Works, seconded by Mr. R. O. Lloyd, O.B.E., Senior Vice-President of the National Federation of Building Trades' Employers, and Leader of the team representing the Building Industry sent to the United States at the invitation of the Anglo-American Productivity Council, and supported by Mr. T. C. Hill, F.R.I.C.S., Chairman of the Quantity Surveyors' Committee of the Royal Institution of Chartered Surveyors, Mr. W. R. Cowen, President of the Federation of Associations of Specialists and Sub-Contractors, Mr. C. Gordon Rowlands, M.A., Secretary of the National Federation of Building Trades Employers, and Mr. Robert H. Matthew [*A*], Architect to the London County Council, a vote of thanks was passed to the President by acclamation, and he briefly responded.

The President presented the Diploma of Distinction in Town Planning to Mr. Robert H. Matthew [*A*], Architect to the London County Council.

The proceedings closed at 7.25 p.m.

Third General Meeting, Tuesday 3 January 1950 at 6 p.m.

The Third General Meeting of the Session 1949-50 will be held on Tuesday 3 January 1950 at 6 p.m. for the following purposes:

To read the minutes of the Second General Meeting held on 15 November 1949; formally to admit new members attending for the first time since their election.

To read the Council's Deed of Award of Prizes and Studentships 1950.

Mr. Hope Bagenal, D.C.M. [*F*], to read a paper on *Concert Halls*.

(Light refreshments will be served before the meeting.)

Qualification for the Associateship R.I.B.A. and for Registration under the Architects' Registration Acts, 1931-38

The Council of the R.I.B.A. have approved revised regulations and syllabus for the Testimonies of Study (Intermediate and Final Examinations) and for the Intermediate, Final and Special Final Examinations, to come into effect on 1 January 1951.

The revised regulations and syllabus will give effect to the decision taken by the Council, and noted with approval by the Architects' Registration Council of the United Kingdom, that the R.I.B.A. Final and Special Final Examinations, and the examinations of the Schools of Architecture recognized for the Associateship of the R.I.B.A. and for registration under the Architects' Registration Acts, 1931-38, be modified to the extent that the Examination in Professional Practice will be held separately to allow candidates to comply with the requirement that twelve months' practical experience in an architectural office or department, or in a suitable technical capacity on building work in course of construction, must be gained after passing an examination recognized for the Associateship or for registration before the Associateship or registration can actually be attained. The following exceptions will be made:

1. Candidates passing the R.I.B.A. Final and Special Final Examinations will be allowed to take the Professional Practice Examination at the first opportunity after passing those examinations provided that they submit satisfactory evidence of having spent, before passing the R.I.B.A. Final or Special Final Examination, a minimum period of six years in an architectural office or department or in a suitable technical capacity on building work in course of construction.
2. Candidates at Recognized Schools of Architecture qualifying for the Associateship or for registration by the successful completion of a part-time or evening course exempting from the R.I.B.A. Intermediate Examination, followed as a minimum by the last two years of a Degree or Diploma Course, will be allowed to take the Professional Practice Examination at the first opportunity after qualifying.

Copies of the revised syllabus and regulations for the R.I.B.A. examinations may be obtained from the Secretary R.I.B.A. on application after 28 November 1949.

The R.I.B.A. London Architecture Bronze Medal 1949

The attention of members is drawn to the Form of Nomination and the conditions subject to which the award will be made for a building built within the counties of London and Middlesex during the three years ending 31 December 1949, enclosed with this issue of the JOURNAL. Any member of the Royal Institute may nominate any building for consideration by the jury.

Nomination forms must be returned to the Secretary, R.I.B.A., not later than 28 February 1950.

Disciplinary Action

The membership of Mr. Gordon Kenneth Moss, of 20 Radcliffe Road, Earlsdon, Coventry, as Associate, has by decree of the Council made on 11 October 1949, pursuant to the Bye-laws, been suspended until 17 June 1950; and accordingly he ceases during that period to be a member of the Royal Institute.

Cessation of Membership

Under the provisions of Bye-law 21 the following have ceased to be members of the Royal Institute:

As Fellows
Herbert Langman.
F. Bruce Lucas.
As Associates
Arthur Gerald Johnson
Ralph Waldo Maitland.
John Steel.
Geoffrey Lawrence Williams.
As Licentiates
Walter James Baker.
Sidney Burn.
Joseph Jonathan Giddens.
John Bertram Lisle Harrison.
Henry Salisbury Malone.
Frederick Stanley Palling.

Christmas 1949

The offices and library of the R.I.B.A. will be closed from Saturday 24 December to Tuesday 27 December inclusive.

British Architects' Conference, Bristol, 7-10 June 1950

The next Annual Conference of the R.I.B.A. and its Allied and Associated Societies will take place at Bristol from 7-10 June 1950. Further details will be published in due course.

BOARD OF ARCHITECTURAL EDUCATION

R.I.B.A. Final and Special Final Examinations Overseas

The R.I.B.A. Final and Special Final Examinations were held in Malaya, Canada, Kenya and Southern Rhodesia from 29 June to 7 July 1949. The successful candidates are as follows:
Final Examination: Inglis, Alick W. G. (Uganda); Vinton, Leonard G. (Bulawayo).
Special Final Examination: Taylor, Eric (Singapore); Thirsk, John (Salisbury).

R.I.B.A. Examination for the Office of Building Surveyor under Local Authorities

At the R.I.B.A. Examination for the Office of Building Surveyor under Local Authorities held on 5, 6 and 7 October 1949 five candidates presented themselves, and the following was successful: Mr. Stanley J. Dobson.

COMPETITIONS

Competition for the Interior Design of the Modern Public House

The Architectural Press, Ltd., invite architects and designers to submit designs in competition for four bars in contemporary public houses.
Assessors: Mr. Hugh Casson, M.A. [*F*], Mr. J. S. Eagles, M.B.E., B.A. (nominated by the Brewers Society), Mr. R. Furneaux Jordan [*F*], Mr. E. B. Musman, B.A. [*F*], Mr. J. M. Richards [*A*] (representing the Editors of THE ARCHITECTURAL REVIEW).
Premiums: £500, £250, £100.
Last day for submitting designs: 28 February 1950.

Conditions were printed in the October number of THE ARCHITECTURAL REVIEW.

Competition in Connection with York Festival 1951

The York Festival Society Ltd. invite architects resident in Great Britain or Eire to submit designs in competition for a block of flats in Paragon Street, York, to be built in connection with the York Festival of 1951.
Assessor: Mr. W. A. Eden, M.A., F.S.A. [*A*].
Premiums: £250, £150, £75.
Last day for submitting designs: 18 January 1950.

Conditions may be obtained on application to Keith Thomson, Esq., Artistic Director, York Festival 1951, 1 Museum Street, York. Deposit £2 2*s*.

University of Nottingham: Proposed Hall of Residence

The Council of the University of Nottingham invite architects to submit designs in competition for a Hall of Residence for Women Students on the Lenton Fields Estate, Beeston Lane, Nottingham.
Assessor: Sir Percy Thomas, O.B.E. (Past President).
Premiums: £1,000, £750, £500.
Last day for submitting designs: 11 March 1950.

Conditions may be obtained on application to The Registrar, The University, Nottingham. Deposit £2 2*s*.

Whitehaven: Arts Centre

The Whitehaven Corporation invite architects resident in this country to submit designs in competition for the Public Hall and Restaurant, which they propose to erect in Whitehaven.
Assessor: Mr. Harold A. Dod, M.A. [*F*].
Premiums: £300, £250, £175.
Last day for submitting designs: 15 March 1950.

Conditions may be obtained on application to the Town Clerk, Town Hall, Whitehaven, Cumberland. Deposit £2.

Competition for War Memorial for Victoria College, Jersey
The Association of Old Victorians invite architects of British nationality to submit designs in competition for proposed War Memorial Buildings in the form of a small Art School at Victoria College, Jersey, C.I.
Assessor: Mr. A. E. O. Geens [*F*].
Premiums: £75, £50, £25.
Last day for submitting designs: 3 April 1950.

Conditions may be obtained on application to Mr. A. H. Worrall, Hon. Treasurer, The Association of Old Victorians, 25 Cleveland Road, Jersey, C.I.

Civic Hall, Guildford
The Guildford Borough Council invite architects registered in the United Kingdom to submit designs in competition for the Civic Hall which they propose to erect in Guildford.
Assessor: Mr. G. A. Jellicoe [*F*].
Premiums: £1,000, £500, £250.
Last day for submitting designs: 30 April 1950.

Conditions may be obtained on application to the Town Clerk, Municipal Offices, Guildford, Deposit £2 2*s*.

Norfolk Education Committee: Competition for a County Modern (Secondary) School at Hunstanton
The Norfolk Education Committee invite architects resident in Great Britain to submit designs in competition for a County Modern (Secondary) School at Hunstanton to accommodate 450 mixed pupils.
Assessor: Mr. Denis Clarke Hall [*F*].
Premiums: £500, £250, £150.
Last day for submitting designs: 28 February 1950.

Conditions may be obtained on application to Mr. W. O. Bell, Chief Education Officer, Norfolk Education Committee, Stracey Road, Norwich. Deposit £2.

GENERAL NOTES

Journal: Bound Copies
The fifty-sixth volume of the 3rd series of the R.I.B.A. JOURNAL was completed with the October issue.

It will be possible to provide a limited number of bound volumes as in previous years, although the difficulty of obtaining bound copies is still manifest and subject to delay. Loose numbers of the volume *must* be returned in exchange for bound volumes.

Orders should be addressed to the Secretary, R.I.B.A. The styles are as follows:

Bound in paper sides, strong linen back. 5*s*. 6*d*. plus 1*s*. postage.

Bound in buckram boards, gilt lettering. 10*s*. 6*d*. plus 1*s*. postage.

Buckram binding cases. 6*s*. plus 6*d*. postage.

ALLIED SOCIETIES

Changes in Officers and Addresses
Northern Architectural Association—Cumberland Branch. Chairman, Mr. Percy Dalton [*A*], 26 Brampton Road, Carlisle.
The Royal Australian Institute of Architects—New South Wales Chapter. Honorary Secretary-Honorary Treasurer, Mr. Eric W. Andrew [*A*], 79 Pitt Street, Sydney, N.S.W.

Due to pressure on space in this JOURNAL *the report of the Annual Dinner of the Nottingham, Derby and Lincoln Architectural Society has had to be deferred until the December* JOURNAL.

Membership Lists

ELECTION: 11 OCTOBER 1949

The following candidates for membership were elected on 11 October 1949.

AS FELLOWS (9)

Edleston: Wilfrid Edgar [*A* 1932], Johannesburg, South Africa.
Hicks: Edward Charles Coleman, A.M.T.P.I. [*A* 1937], Dacca, East Bengal.
Marwick: Thomas Waller, A.A.Dip. [*A* 1931], Edinburgh.
Maynard: Frederick James [*A* 1930], Shortlands, Kent.
Scott: Herman Alexander [*A* 1922], Bolney, Sussex.
Taylor: Charles Silver Milne [*A* 1933], Durban, South Africa.
Watson: Lesslie Kenyon (Lt.-Col.), M.B.E., T.D., M.A., A.M.T.P.I. [*A* 1930].
and the following Licentiates who are qualified under the provisions of Section IV, Clause 4 (*c*) (ii) of the Supplemental Charter of 1925:—
Blackmore: Alfred Charles, M.B.E., F.R.I.C.S., Hull.
Matthews: Ralph Edward.

AS ASSOCIATES (54)

Aitken: David William.
Atkinson: John James, Dip.Arch. (Regent Street Poly.).
Barber: Thomas Arnold.
Berger: Maurice Louis, B.Arch. (Cape Town), Port Elizabeth, South Africa.
Bryan: John Leslie, Leicester.
Butler: John Harding, Brisbane, Queensland, Australia.
Carver-Smith: Philip John, Nottingham.
Cawsey: Clifford Frederick Hillhouse, Dip.Arch. (Regent Street Poly.), Orpington.
Chadwick: Kathleen Mary (Miss), Kongwa, Tanganyika Territory.
Cownie: James Charles David, Dip.Arch. (Nottingham), Beeston.
Craven: Kenneth Walter, Preston.
Dartford: James Richard.
Dixon: Frank Horace Cedric, Windhoek, South Africa.
Dodds: Edward Gordon, Buenos Aires, Argentina.
Dyer: Donald Lewis, Sawbridgeworth.
Freak: Albert Anzac, Devonport, Tasmania.
Fullman: Trevor, West Byfleet.
Galloway: Douglas, Blackpool.
Glanfield: John Riley.
Greenland: Edward Hugh, Bristol.
Hather: James Ronald, Doncaster.
Hicks: Thomas Henwood, Wadebridge.
Higgs: Peter Leslie, Newcastle-on-Tyne.
Hudson: John Robert Harold, Cheam.
Kaye: Sidney, Dip.Arch. (Regent Street Poly.).
Kennan: John Joseph, Leamington Spa.
Linton-Smith: John, Rose Bay, N.S.W., Australia.
Lovejoy: Derek Alfred Walter.
Lupton: Thomas Michael.
McDonald: Hector James, Brisbane, Queensland, Australia.
MacDonell: Graham Alasdair.
Mackenzie: Andrew Riddell, Dip.Arch. (Glasgow), Glasgow.
MacMahon: Thomas Stanislaus, B.Arch. (Dublin), Limerick, Eire.
Maidment: Eric David.
Mallory: Alec Leslie, Hull.
Miles: Ernest William, Thornton Heath.
Moxley: Peter Knight, Durban, South Africa.
Myles: David, Dip.Arch. (Edin.), Johannesburg, South Africa.
Parson: Howard Nicholas.
Peake: John Stanley, Berkhamsted.
Perrott: Leslie Marsh, Jnr., Brighton, Melbourne, Australia.
Rice-Oxley: Patricia Millicent (Mrs.), Jersey, C.I.
Rosenbaum: Frederic, Glen Iris, Victoria, Australia.
Russell: James Leighton, Newport, Mon.
Skelton: Norman Thomas, Cardiff.
Smith: David Barnard.
Stephenson: Arthur Peter, Sydney, N.S.W., Australia.
Todd: Robert Arthur, Johannesburg, South Africa.
Tulley: Desmond, Dip.Arch. (Glasgow), Glasgow.
Tyrrell: James Peter, Dip.Arch. (Regent Street Poly.).
Wainscott: Ewen Martin.
Walters: Samuel Hendrik, Cape Town, South Africa.
Wille: Roland Carl, Dip.Arch. (Cape Town), Salisbury, S. Rhodesia.
Woods: Ian Robert James, Glasgow.

AS LICENTIATES (14)

Betteridge: Edward John George.
Birtwistle: Tom (Major, R.E. (T.A.)), Bury.
Findlay: George Kendrick.
Fowler: Ernest Alfred Herbert.
Gray: William Stuart, Scarborough.
Kennedy: John Frederick.
Leslie-Carter: William Charles.
Phillips: Samuel Charles, Worthing.
Read: Albert Henry, Hull.
Roberts: Norman Hargrave, Leeds.
Smart: Stanley Frederick.
Smith: Arthur Frederick, A.R.I.C.S., Banstead.
Tasker: Frederick Edward.
Taylor: Gerald Roy, Aldershot.

ELECTION: 29 NOVEMBER 1949

An election of candidates for membership will take place on 29 November 1949. The names and addresses of the candidates with the names of their proposers, found by the Council to be eligible and qualified in accordance with the Charter and Bye-laws, are herewith published for the information of members. Notice of any objection or any other communication respecting them must be sent to the Secretary, R.I.B.A., not later than Monday 28 November 1949.

The names following the applicant's address are those of his proposers.

AS FELLOWS (14)

Carr: David [*A* 1930], 110 Old Brompton Road, S.W.7; 191 South Croxted Road, S.E.21. Robert Atkinson, A. F. B. Anderson, W. F. Howard.

Fidler: Alwyn Gwilym Sheppard, M.A., B.Arch. A.M.T.P.I. [*A* 1933], c/o Crawley Development Corporation, Broadfield, Crawley, Sussex. The Old Coach-house, Tilgate, Crawley, Sussex. Anthony Minoprio, H. G. C. Spencely, Darcy Braddell.

Hurden: Stanley Allen [*A* 1930], Lloyds Bank Chambers, 2 Henrietta Street, W.C.2; 49 Edenfield Gardens, Worcester Park, Surrey. S. F. Bestow, H. W. E. Lindo, F. Sutcliffe.

Slater: Martin Johns [*A* 1919], 8 Lower Brook Street, Ipswich; Firbank, Dalton Road, Ipswich. E. J. Symcox, T. G. Scott, Maurice Chesterton.

Stewart: Arthur Ammerman [*A* 1932], 6 Cromwell Place, South Kensington, S.W.7; Grove Meadow, Jordans Way, Jordan, Bucks. W. F. C. Holden, W. D. Hartley, A. R. F. Anderson.

Todd: George Richard [*A* 1934], Town Hall. Torquay; 48 Fore Street, Barton, Torquay. L. G. Hannaford, Sidney Loweth, J. N. Meredith.

Tripe: **Anthony Charles** [*A* 1934], 11 Duke Street, Manchester Square, W.1; 49 Hill Street, W.1. G. G. Wornum, Michael Tapper, Maxwell Ayrton.

and the following Licentiates who have passed the qualifying Examination:—

Elder: Henry, M.B.E., 66 Manchester Road, Wilmslow, Cheshire. F. L. Halliday P. G. Fairhurst, C. G. Agate.

Kelsey: Alfred Edward, 35 Gordon Square, W.C.1; 3 Groveland Avenue, Norbury, S.W.16. Frederick Gibberd, F. R. S. Yorke, Oliver Law.

Korn: Arthur, 34-36 Bedford Square, W.C.1; 12 Christchurch Avenue, N.W.6. E. M. Fry, R. F. Jordan, Bertram Carter.

Riss: Egon, National Coal Board, Scottish Division, 14-16 Grosvenor Street, Edinburgh, 12. R. F. Jordan, R. E. Enthoven, A. M. Chitty.

and the following Licentiates who are qualified under Section IV, Clause 4 (*c*) (ii) of the Supplemental Charter of 1925:

Brady: Kenneth Russell, c/o Manchester Ship Canal Co., King Street, Manchester, 2; 7 Lansdowne House, Didsbury, Manchester, 20. H. T. Seward, Lt.-Col. A. K. Tasker, Sir Hubert Worthington.

Eltringham: Thomas Rutter, O.B.E., Ministry of Works, Cleland House, Page Street, S.W.1; 44 Leeside Crescent, Golders Green, N.W.11. W. A. Rutter, Sir Charles Mole, G. C. Wilson.

Walker: Cyril Herbert, O.B.E., M.C., Director of Housing and Valuer to the London County Council, County Hall, S.E.1; 4 Bramley Close, Bramley Hill, Croydon. Briant Poulter, Charles Blythin, W. R. Davidge.

AS ASSOCIATES (396)

The name of a school, or schools, after a candidate's name indicates the passing of a recognized course.

Abbott: Ian Harry (Birmingham Sch. of Arch.), 1025 Warwick Road, Acock's Green, Birmingham, 27. George Drysdale, T. M. Ashford, A. R. Young.

Abbott: Leonard Alfred [Final], 'Corbiere,' 123 Downs Court Road, Purley, Surrey. J. K. Hicks, E. C. Scherrer, J. S. Walkden.

Adam: Andrew, Dip.Arch. (Glasgow) (Glasgow Sch. of Arch.), 'Paragon,' Fairlie, Ayrshire. Prof. W. J. Smith, Alexander Wright, J. S. Maitland.

Adams: Brian Lemeslie (Arch. Assoc. (London): Sch. of Arch.), 12 Neville Terrace, S.W.7. R. F. Jordan, H. G. Goddard, A. R. F. Anderson.

Adams: Kenneth George [Final], 100 Banbury Road, Oxford. David Booth, H. W. Smith, David Beecher.

Ambler: Michael Midgley (Leeds Sch. of Arch.), 12 East Cliff, Lightcliffe, nr. Halifax, Yorks. Applying for nomination by the Council under Bye-law 3 (*d*).

Anderson: Alexander Berry (Dundee Coll. of Art: Sch. of Arch.), 168 Albert Street, Dundee. John Needham, G. C. Young, Donald Ross.

Archibald: William Dixon (Arch. Assoc. (London): Sch. of Arch.), c/o Messrs. Garbutt, Archibald and Archibald, 23 and 25 Albert Road, Middlesbrough. R. F. Jordan, H. G. Goddard, A. R. F. Anderson.

Ash: Jean Mary (Mrs.), B.Arch. (Dunelm) (Hons.) (King's Coll. (Univ. of Durham), Newcastle-on-Tyne, Sch. of Arch.), 116 Arnold Avenue, Styvechale, Coventry. Prof. W. B. Edwards, F. A. Child, F. N. Weightman.

Assomatites: Andrew John [Special Final], 104 Ifield Road, London, S.W.10. L. S. Stanley, and applying for nomination by the Council under Bye-law 3 (*d*).

Aylwin: John Maxwell [Final], 26 West Street, Farnham. G. M. Aylwin, J. L. Denman, K. E. Black.

Badnitz: Leslie Spencer [Special Final], Tower House, Warltersville Road, London, N.19. D. L. Solomon, M. N. Castello, Morris Joseph.

Bailey: Claude Henry Ralph (Birmingham Sch. of Arch.), 17 Alexander Road, Acocks Green, Birmingham, 27. George Drysdale, J. B. Surman, T. M. Ashford.

Baker: Ian Crampton (Arch. Assoc. (London): Sch. of Arch.), 71 Egerton Gardens, S.W.3. R. F. Jordan, H. G. Goddard, A. R. F. Anderson.

Ballantyne: Alan Robert (Arch. Assoc. (London): Sch. of Arch.), 11 Stanley Gardens, W.11. George Fairweather, F. R. S. Yorke, Edward Playne.

Barber: Harold John (Bartlett Sch. of Arch.: Univ. of London), Liege Cottage, Botesdale, nr. Diss, Norfolk. Prof. H. O. Corfiato, L. S. Stanley, R. C. White-Cooper.

Barker: Brian Ashley (Arch. Assoc. (London): Sch. of Arch.), 138 Old Bedford Road, Luton. R. F. Jordan, H. G. Goddard, A. R. F. Anderson.

Barnett: Clifford Harry, B.Arch. (Hons.) (L'pool) (Liverpool Sch. of Arch.: Univ. of Liverpool), 323 Kingston Road, Willerby, Hull. Prof. L. B. Budden, Prof. Gordon Stephenson, D. Brooke.

Barnett: Geoffrey Richard, Dip.Arch. (B'ham) (Birmingham Sch. of Arch.), 11 Bickenhill Road, Marston Green, Birmingham. T. S. Wood, George Drysdale, C. E. M. Fillmore.

Barrie: Edward Alexander (Arch. Assoc. (London): Sch. of Arch.), 43 Bedford Court Mansions, W.C.1. R. F. Jordan, H. G. Goddard, A. R. F. Anderson.

Barrow: Dennis Ronald (Nottingham Sch. of Arch.), 29 Caledon Road, Sherwood, Nottingham. T. N. Cartwright, J. W. M. Dudding, F. A. Broadhead.

Bartlam: Walter Ashley (Birmingham Sch. of Arch.), 'Winnel,' Fleurs Drive, Elgin, Morayshire. George Drysdale, T. M. Ashford, Herbert Jackson.

Bartlett: Peter Geoffrey (Nottingham Sch. of Arch.), 19a Herbert Road, Sherwood Rise, Nottingham. J. W. M. Dudding, F. W. C. Gregory, Percy Bartlett.

Baxter: Diana Anita (Miss) (Arch. Assoc. (London): Sch. of Arch.), Hazlewood House, Hazlewood Lane, N.13. R. F. Jordan, and the President and Hon. Secretary of the A.A. under Bye-law 3 (*b*).

Beanland: Gerald Roy (Leeds Sch. of Arch.), 71 Savile Road, Methley, nr. Leeds. G. H. Foggitt, Victor Bain, N. R. Paxton.

Beaven: Leonard (Welsh Sch. of Arch.: The Tech. Coll., Cardiff), 9 South Walk, Barry, Glam. Lewis John, T. A. Lloyd, C. F. Jones.

Belcher: Daphne Anne (Miss) [Final], 2 Mill Road, Worthing. K. E. Black, G. M. Aylwin, A. Douglas Jones.

Bellamy: Alfred John Spencer [Special Final], 31 Coventry Road, Beeston, Notts. E. W. Roberts, E. Frear, W. E. Wolff.

Bethell: George Alfred [Final], 50 Abbeydale Park Rise, Totley Rise, Sheffield. W. G. Davies, J. McD. Fairweather, W. L. Clunie.

Bett: Malcolm James, Dip. Arch. (Dundee Coll. of Art: Sch. of Arch.), c/o Smeaton, 42 Park Road, Dundee, Angus. John Needham, William Salmond, Donald Ross.

Biggs: Alfred George [Special Final], 119 Whitepit Lane, Newport, I.O.W. Sydney Gregson, Vernon Aldridge, A. C. Cowtan.

Bird: Arthur Clarence [Special Final], 28 Dare Road, Erdington, Birmingham, 23. L. S. Stanley, J. B. Surman, C. F. Martin.

Blackmore: John Wilfrid (Arch. Assoc. (London): Sch. of Arch.), 24 Westbourne Avenue, Hull. R. F. Jordan, H. G. Goddard, A. R. F. Anderson.

Blanchard: Melville (King's Coll. (Univ. of Durham), Newcastle-upon-Tyne, Sch. of Arch.) 80 Cairo Street, Sunderland, Co. Durham. Prof. W. B. Edwards, J. H. Napper, G. R. Clayton.

Bleasdale: Raymond John (Leeds Sch. of Arch.), 2 Lynton Grove, Heaton, Bradford, Yorks. H. W. Barker, Eric Morley, W. Illingworth.

Bliss: Terence Warren (The Poly., Regent Street, London: Sch. of Arch.), 3 Blackburn Road, Hampstead, N.W.6. Peter Moro, Dr. J. L. Martin, Edwin Williams.

Bloom: Victor Jack (Northern Poly. (London): Dept. of Arch.), 10 Lytton Close, Finchley, N.2. T. E. Scott, F. A. Vernon, E. C. Kent.

Boden: Allen (Univ. of Sheffield: Dept. of Arch.), 50 Norton Lees Lane, Sheffield, 8. Prof. Stephen Welsh, H. B. Leighton W. L. Clunie.

Borthwick: Peter Lamont Burnside [Final], 73 Waverley Gardens, Glasgow, S.1. T. S. Cordiner, Prof. W. J. Smith, William McCrea.

Boston: Peter Shakerley, M.C., M.A.(Cantab), B.Arch. (Hons.) (L'pool) (Liverpool Sch. of Arch.: Univ. of Liverpool), Duddon, Hillfoot Road, Woolton, Liverpool. Prof. L. B. Budden, F. X. Velarde, Prof. Gordon Stephenson.

Bottomley: Eric Michael, B.Arch. (Liverpool Sch. of Arch.: Univ. of Liverpool), Winston, Windermere, Westmorland. Prof. L. B. Budden, B. A. Miller, F. X. Velarde.

Boucher: Ernest John Townsend, A.F.C. [Special Final], 'Erw's Delyn', Sully Road, nr. Penarth, Glam. L. R. Gower, Lewis John, H. F. Trew.

Bourne: Cecil John (Birmingham Sch. of Arch.), Station House, Honeybourne, Worcestershire. T. M. Ashford, L. F. Bullivant, Reginald Edmonds.

Bourne: Kenneth Charles [Final], Honeybourne, Worcestershire. F. H. Heppel, David Beecher, E. A. L. Martyn.

Bowyer: Jack Trory (Leeds Sch. of Arch.), 77 Saxon Road, Clive Vale, Hastings. F. C. Benz, Edgar Bunce, G. E. Burgess.

Boyd: Douglas Gordon, B.Arch. (Liverpool Sch. of Arch.: Univ. of Liverpool), 126 Greenhill, Hampstead, N.W.3. Prof. L. B. Budden, F. X. Velarde, D. Brooke.

Brandt: Alan James (Northern Poly. (London): Dept. of Arch.), 28 Manor Way, North Harrow, Middlesex. T. E. Scott, A. L. Osborne, and applying for nomination by the Council under Bye-law 3 (*d*).

Brett: Elizabeth Mary (Miss) (Arch. Assoc. (London): Sch. of Arch.), 'Sunnybank,' Overbury, nr. Tewkesbury, R. F. Jordan, and the

President and Hon. Secretary of the A.A. under Bye-law 3 (*b*).

Bright: Geoffrey William (Welsh Sch. of Arch.: The Tech. Coll., Cardiff), 135 Llandaff Road, Cardiff. Lewis John, Sir Percy Thomas, T. Alwyn Lloyd.

Britain: Rossiter Frank (Bartlett Sch. of Arch.: Univ. of London), 15 Eaton Terrace, S.W.1. Prof. H. O. Corfiato, S. L. Thomson, D. du R. Aberdeen.

Brodie: Ronald Fordyce (Leeds Sch. of Arch.), 8 The Ivies, Lidget Hill, Pudsey, nr. Leeds. Applying for nomination by the Council under Bye-law 3 (*d*).

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Vanston: James Frederick [Special Final], 196 Thorpe Road, Norwich. C. J. Tomkins, L. G. Hannaford, F. G. Limmer.

Verrall: Peter Wyndham (Arch. Assoc. (London): Sch. of Arch.), 23 Beaconsfield Road, W.5. L. K. Hett, R. F. Jordan, H. G. Goddard.

Vickers: George Moston (Univ. of Sheffield: Dept. of Arch.), 65 Sutherland Avenue, Maida Vale, W.9. Prof. Stephen Welsh, Howard Robertson, J. M. Easton.

Voelcker: Ann (Mrs.) (Arch. Assoc. (London): Sch. of Arch.), 12a Hillside Gardens, Highgate, N.6. R. F. Jordan, H. G. Goddard, A. R. F. Anderson.

Waddington: Margaret (Miss), B.A. (Hons. Arch.) (M'chester) (Victoria Univ., Manchester: Sch. of Arch.), 9 Holland Road, Spalding. Prof. R. A. Cordingley, W. E. N. Webster, J. P. Nunn.

Wade: John Bryan, B.Arch. (L'pool) (Liverpool Sch. of Arch.: Univ. of Liverpool), 40 Ashton Road, Hillside, Southport. Prof. L. B. Budden, F. X. Velarde, Prof. Gordon Stephenson.

Walker: Alan Henry (Northern Poly. (London): Dept. of Arch.), 85 Friern Lane, Whetstone, N.20. T. E. Scott, Sir Giles Scott, Lord Mottistone.

Walker: Charles Matthew (King's Coll. (Univ. of Durham), Newcastle-upon-Tyne: Sch. of Arch.), 84 Ings Road, Redcar, Yorks. Prof. W. B. Edwards, J. H. Napper, J. A. R. McKee.

Wallis: George John (Univ. of Sheffield: Dept. of Arch.), 'Devonia,' Hatchell Drive, Bessacarr, Doncaster. Prof. Stephen Welsh, H. B. Leighton, H. B. S. Gibbs.

Walton: Jeffrey, Dip.Arch. (Dist.) (Leeds) (Leeds Sch. of Arch.), 'Spinkwell', Jenkin Road, Horbury, nr. Wakefield, Norman Culley, G. H. Foggitt, F. Vaux.

Ward: Donald Leslie [Final], 8 Fairleigh Court, Glendale Gardens, Leigh-on-Sea, Essex. J. M. Scott, A. S. Belcham, P. G. Hayward.

Warner-Riley: Walter Stanley [Special Final], Flat 'H', Northbrook Park, Countess-Wear, Exeter. Niel Martin-Kaye, H. B. Rowe, L. D. Tomlinson.

Weeks: Alexander James [Final], 7 Durham Road, East Finchley, N.2. T. E. Scott, Hubert Lidbetter, Charles Brett.

Wells: Edward Martin Glossop (Bartlett Sch. of Arch.: Univ. of London), 32 Gunter Grove, Chelsea, S.W.10. Prof. H. O. Corfiato, S. L. Thomson, C. L. Gill.

Wells: Geoffrey Banham [Final], 3 High Street, Witney, Oxon. S. E. Urwin, B. H. Sutton, E. M. Rice.

Wellwood: William Ritchie, Dip.Arch. (Edinburgh) (Edinburgh Coll. of Art: Sch. of Arch.) 1 Gladstone Terrace, Edinburgh, 9. J. F. Matthew, W. I. Thomson, J. R. McKay.

Westaway: Ronald John [Special Final], 12 Bennetts Way, Shirley, Croydon. Sir Percy Thomas, H. D. Roberts, Daydon Griffiths.

Whear: William George [Special Final], 26 Warwick Gardens, Ilford. D. W. Aldred, H. M. Luyken, Bernard George.

White: Peter Edward (Leeds Sch. of Arch.), 90 Parkland Drive, Leeds, 6. R. H. Winder, N. R. Paxton, G. H. Foggitt.

White: Raymond Charles (Birmingham Sch. of Arch.), 188 Queens Road, Yardley, Birmingham, 26. A. Douglas Jones, T. M. Ashford, J. P. Bridgwater.

Whitham: June Denise (Miss) (Univ. of Sheffield: Dept. of Arch.), 77 Grosvenor Street, W.1. Prof. Stephen Welsh, H. B. Leighton, H. B. S. Gibbs.

Whittaker: Telford John (Arch. Assoc. (London) (Sch. of Arch.), 60 Albany Road, Sittingbourne, Kent. R. F. Jordan, H. G. Goddard, A. R. F. Anderson.

Wilkinson: Ellis (Victoria Univ., Manchester: Sch. of Arch.), 2 Beacon Grove, Cadley, Preston, Lancs. Prof. R. A. Cordingley, G. N. Hill, J. P. Nunn.

Williams: Frank Clifford [Special Final], 21 Manifold Gardens, Efford, Plymouth. E. A. W. Ixer, E. U. Channon, L. R. Gower.

Williams: Laurence Arthur (Welsh Sch. of Arch.: The Tech. Coll., Cardiff), 49 Pedair-Erw Road, Birchgrove, Cardiff. Lewis John, Sir Percy Thomas, T. A. Lloyd.

Williams: Michael Alan Shenton, B.A. (Hons. Arch.) (Univ. of Sheffield: Dept. of Arch.), 12 Stumperlowe Avenue, Sheffield, 10. Prof. Stephen Welsh, H. B. Leighton, J. S. Beaumont.

Williams: Peter Leslie Aitken (Glasgow Sch. of Arch.), 33 Cecil Street, Hillhead, Glasgow, W.2. Prof. W. J. Smith, T. S. Cordiner, William McCrea.

Wilson: Charles Herbert [Final], 223 Oxford Street, Barrow-in-Furness. Applying for nomination by the Council under Bye-law 3 (*d*).

Wilson: Colin Alexander St. John, B.A. (Arch.) (Cambridge) (Bartlett Sch. of Arch.: Univ. of London), Bishopscourt, Chelmsford, Essex, Prof. H. O. Corfiato, L. S. Stanley, D. du R. Aberdeen.

Winter: Odette Madeline Denise (Miss) (Bartlett Sch. of Arch.: Univ. of London), 45 Elmwood Road, Chiswick, W.4. Prof. H. O. Corfiato, L. S. Stanley, D. du R. Aberdeen.

Winteringham: Claude Richard Graham (Birmingham Sch. of Arch.), 97 Oxford Road, Moseley, Birmingham, 13. S. T. Walker, F. Chippindale, A. Douglas Jones.

Woffenden: Harry Greenwood, B.A. (Arch) (London) (Bartlett Sch. of Arch.: Univ. of London), 32 Gunter Grove, Chelsea, S.W.10. Prof. H. O. Corfiato, L. S. Stanley, D. du R. Aberdeen.

Wolstenholme: Michael Ashmore (Arch. Assoc. (London): Sch. of Arch.), 98 Redcliffe Gardens, S.W.10. R. F. Jordan, H. G. Goddard, J. G. Warwick.

Wood-Jones: Raymond Bernard, B.Arch.(Hons) (L'pool) (Liverpool Sch. of Arch.: Univ. of Liverpool), 33 Winchester Drive, Wallasey, Cheshire. Prof. L. B. Budden, Prof. Gordon Stephenson, F. X. Velarde.

Worth: Kenneth Malcolm, Dip.Arch. (Leeds) (Leeds Sch. of Arch.), 39 George Street, Wakefield, Yorks. Applying for nomination by the Council under Bye-law 3 (*d*).

Wright: Cecil Frank (Dip.Arch. (L'pool) (Liverpool Sch. of Arch.: Univ. of Liverpool), 51 Ramilies Road, Liverpool, 18. Prof. L. B. Budden, F. X. Velarde, D. Brooke.

Wright: Jennifer Mary (Mrs.) (Arch. Assoc. (London): Sch. of Arch.), 11 Campden Hill Road, W.8. R. E. Enthoven, R. F. Jordan, E. Forster.

Wright: Norman (Leeds Sch. of Arch.), 31 Smawthorne Lane, Castleford, Yorks. Applying for nomination by the Council under Bye-law 3 (*d*).

Wright: Richard Gordon, Dip.Arch. (Sheffield) (Univ. of Sheffield: Dept. of Arch.), 54 Lowgates, Staveley, nr. Chesterfield. Prof. Stephen Welsh, H. B. Leighton, H. B. S. Gibbs.

Wyatt: James Spencer (Arch. Assoc. (London): Sch. of Arch.), 92 Idmiston Road, S.E.27. R. F. Jordan, H. G. Goddard, A. R. F. Anderson.

AS LICENTIATES (6)

Barton: Vincent Albert Mead, c/o Messrs. Gallannaugh and Nicholls, Waterloo House, 41 St. Mary Street, Bridgwater, Somerset; Clock House, Nether Stowey, Bridgwater. W. E. Masters, I. G. Smith, W. B. Stedman.

Brown: Robert Maxwell, c/o I.C.I. Ltd., Wilton Works (Hut B), Wilton Castle, Middlesbrough; 7 Blenheim Terrace, Redcar, Yorks. W. A. Johnson, H. T. Seward, Francis Jones.

Burrows: Thomas Mortimer, 44 Bedford Row, W.C.1; 6 Berwyn Road, Richmond, Surrey. H. L. Bloomfield, G. J. Buckingham, C. H. Fitch.

Rundle: Kenneth Edwin, c/o Messrs. Cowell, Drewitt and Wheatly, Mansion House, Truro; The Sheiling, Moresk, Truro. R. F. Wheatly, H. V. C. Hague, F. G. Drewitt.

Vincent: John Eldon Newby, M.B.E., T.D., 24 The Avenue, Southampton; The Coombe Cottage, Braishfield, Hants. H. P. Gordon W. G. L. Cheriton, Ernest Bird.

Watson: David Graham, Scottish C.W.S. Ltd., Architectural Dept., 119 Paisley Road, Glasgow, C.5; 16 Union Street, Stirling. Walter Underwood, F. R. Wylie, E. S. Bell.

ELECTION: 7 MARCH 1950

An election of candidates for membership will take place on 7 March 1950. The names and addresses of the overseas candidates, with the names of their proposers, are herewith published for the information of members. Notice of any objection or any other communication respecting them must be sent to the Secretary, R.I.B.A. not later than Saturday 11 February 1950.

The names following the applicant's address are those of his proposers.

AS FELLOW (1)

Upton: Herbert Cooper [*A* 1935], Deputy Government Architect, Federation of Malaya, Malaya; 'Greenleaves', Arundel Road, Seaford, Sussex, England. A. J. S. Hutton, Darcy Braddell, J. L. Denman.

AS ASSOCIATES (30)

The name of a school, or schools, after a candidate's name indicates the passing of a recognized course.

Achwal: Madhao Bhaskar [Final], Achwal Wada, Bazzar Peth, Kalyan, Thana Dist., India. C. M. Master, S. H. Parelkar, H. N. Dallas.

Beard: James Albert, B.Arch.(N.Z.) (Passed a qualifying Exam. approved by the N.Z.I.A.), 65 Orangi Kaupapa Road, Northland, Wellington, W.2, New Zealand. W. M. Page, and the President and Honorary Secretary of the N.Z.I.A. under Bye-law 3 (*a*).

Bhada: Nadir Jamsetji [Special Final], Mistry Building, 38-40 Sleater Road, Bombay, India. D. W. Ditchburn, Prof. S. S. Reuben, G. B. Mhatre.

Biggar: John Wilson (Passed a qualifying Exam. approved by the I.S.A.A.), 32 Cripps Road, Palmerston, Umtali, S. Rhodesia. Applying for nomination by the Council under Bye-law 3 (*d*).

Castiglione: Alfonso Roger [Special Final], Directorate-General of Survey, Baghdad, Iraq. Raglan Squire, C. W. Box, Edward Maufe.

Cheyne: John Gilbert (Passed a qualifying Exam. approved by the I.S.A.A.), c/o Messrs. B.St.C. Lightfoot and Partners, 17 Church Square, Cape Town, S. Africa. Prof. W. B. Edwards, D. R. Harper, R. F. R. Day.

Chokshi: Rajendra Kanaiyalal [Final], Y.M.C.A. Student Branch, Lamington Road, Bombay, India. Prof. S. S. Reuben, S. J. Narwekar, S. H. Parelkar.

Faure: Lorette Talitha, B.Arch. (Cape) (Passed a qualifying Exam. approved by the I.S.A.A.), c/o Messrs. S. N. Tomkin and Partners, Palmer House, Smith Street, Durban. Prof. L. W. T. White, O. Pryce Lewis, D. R. Harper.

Gupte: Manohar Gajanan [Final], Yusuf Building, Churchgate Street, Fort, Bombay, India. Prof. S. S. Reuben, Claude Batley, C. M. Master.

Hartley: Michael Bernard (Passed a qualifying Exam. approved by the I.S.A.A.), 35 Andries Pretorius Street, Krugersdorp, Transvaal, South Africa. K. E. F. Gardiner, A. S. Furner, and applying for nomination by the Council under Bye-law 3 (*d*).

Hillary: Richard George (Passed a qualifying Exam. approved by the N.Z.I.A.), 38 Tawera Road, Greenlane, Auckland, S.E.4, New Zealand. W. H. Gummer, C. R. Ford, A. C. Light.

Hoadley: Charles Prior (Passed a qualifying Exam. approved by the N.Z.I.A.), c/o Messrs. Gummer and Ford and Partners, N.Z. Insurance Buildings, Queen Street, Auckland, New Zealand. C. R. Ford, M. K. Draffin, and applying for nomination by the Council under Bye-law 3 (*d*).

Kakajiwala: Salehbhai Tayeballi [Final], Saify-Villa, Ghodbunder Road, Santacruz, Bombay, 23, India. C. M. Master, Prof. S. S. Reuben, G. B. Mhatre.

Khan: Mohamad Ghousullah, B.A. (Madras) (Arch. Assoc. (London): Sch. of Arch.), House 3, Road 12, Jubilee Hill, Hyderabad (Deccan), India. R. F. Jordan, Frederick MacManus, J. M. Easton.

Kirtikar: Kunjbihari Anandrao [Final], 25-26 Waterloo Street, Calcutta, 1, India. Prof. S. S. Reuben, S. H. Parelkar, H. N. Dallas.

Klempman: Charlotte (Miss), B.Arch. (Rand) (Passed a qualifying Exam. approved by the I.S.A.A.), 342 Mzilikazi Drive, Northcliff, 2, Johannesburg. Applying for nomination by the Council under Bye-law 3 (*d*).

Levinsohn: Ray (Miss), B.Arch. (Rand) (Passed a qualifying Exam. approved by the I.S.A.A.), 27 Oxford Road, Forest Town, Johannesburg, S. Africa. Applying for nomination by the Council under Bye-law 3 (*d*).

Lochner: Christiaan Lodewyk (Passed a qualifying Exam. approved by the I.S.A.A.), United Buildings, Plein Street, Stellenbosch, Cape Province, South Africa. Prof. L. W. T. White, D. R. Harper, O. Pryce Lewis.

Narwekar: Jayant Shridhar [Final], 8 Amar Niwas, Opp. Prarthana Samaj, Girgaum, Bombay, India. Prof. S. S. Reuben, S. H. Parelkar, H. N. Dallas.

Orr: David Selwyn (Passed a qualifying Exam. approved by the N.Z.I.A.), 5 Dover Street, Island Bay, Wellington, New Zealand. W. M. Page, and applying for nomination by the Council under Bye-law 3 (*d*).

Pundlik: Ratnakar Gangadhar [Final], c/o S. A. Gopujkar, Esq., 234 Ganga Nivas, Walkeshwar, Bombay, India. D. W. Ditchburn, S. H. Parelkar, S. J. Narwekar.

Sharma: Charan Das [Final], 31-53 W.E.A, Karol Bagh, Delhi, India. G. B. Deolaliker, R. L. Gehlote, Walter George.

Shunn: John Mossop (Passed a qualifying Exam. approved by the I.S.A.A.), University of the Witwatersrand, Johannesburg, South Africa. Applying for nomination by the Council under Bye-law 3 (*d*).

Taylor: Eric [Final], Department of the Municipal Architect, Singapore. W. I. Watson, F. W. Brewer, Ng Keng Siang.

Thompson: Ernest Brennon, B.Arch. (Sydney). (Passed qualifying Exam. approved by the N.Z.I.A.), 21 Bealey Avenue, Christchurch, New Zealand. Prof. Leslie Wilkinson, J. D. Moore, W. R. Richardson.

Thorpe: Raymond Armstrong (Passed a qualifying Exam. approved by the N.Z.I.A.), 67 Sylvan Avenue, Northcote, Auckland, New Zealand. M. K. Draffin, C. R. Ford, W. H. Gummer.

Tiwari: Loke Nath Gadadhar Prasad [Final], 257 George-Town, Jubbulpore, C.P., India. S. H. Parelkar, Prof. S. S. Reuben, H. N. Dallas.

Tomlin: Derek Philip, B.Arch. (Cape Town) (Passed a qualifying Exam. approved by the I.S.A.A.), 6 Nevada, Seacliffe Road, Sea Point, Cape Town, S. Africa. Prof. L. W. T. White, O. Pryce Lewis, D. R. Harper.

Toni: Francis John Peter (Passed a qualifying Exam. approved by the R.A.I.A.), 307 Lancaster Road, Ascot, Brisbane, Australia. E. P. Trewern, F. G. Costello, and applying for nomination by the Council under Bye-law 3 (*d*).

Vautier: Phillip Lawson (Passed a qualifying Exam. approved by the N.Z.I.A.), 40 Matai Road, Greenlane, Auckland, S.E.4, New Zealand. C. R. Ford, M. K. Draffin, and applying for nomination by the Council under Bye-law 3 (*d*).

AS LICENTIATE (1)

Turner: John Raymond, c/o Messrs. Blackburne, Norburn and Partners, P.O. Box 890, Nairobi, Kenya, East Africa. G. B. E. Norburn L. G. Jackson, H. T. Dyer.

Review of Films—13

The country of origin and date of release are given first. The film is in monochrome unless otherwise stated. The sizes (35 *mm. and* 16 *mm.*) *are given. Sound films are marked 'sd.', and silent 'st.' The running time is given in minutes.*
(F) indicates free distribution.
(H) indicates that a hiring fee is payable.

The Plan and the People

Britain 1945. (*F*)

Summary. An attempt to relate the ideas behind the London Plan to the homes and lives of the people living in the area covered by the Plan. Shots of London's congested traffic and unplanned distribution of homes and factories intermixed show the necessity of co-ordinated planning. The pros and cons of flats and homes are discussed at local authority meetings without any definite opinions or suggestions being arrived at. Returning soldiers make a tour of their own neighbourhood in an effort to find out what kind of homes people want, but no definite proposals are put forward.

Appraisal. The arguments in this film are muddled and incomplete, and the story suffers from having two themes which confuse the issue. It is not clear what story the film is trying to put over, and it lacks continuity. The camera work in places suffers from being over exposed and is of a rather dull quality. There are no examples of well-designed homes, only negative illustrations shown. The idea of the film is promising, and with different treatment the film could be of value.

35 sd. 16 sd. 19 minutes. Central Film Library, Imperial Institute, S.W.7. (Ref. No. U.K. 731.)

Painting of Buildings

Britain 1948. (*F*)

Summary. This film is divided into two parts. Part 1.—'Preparation and Priming'—explains the reason for using paints, their composition and manufacture. It then deals with the preparation and priming of different surfaces—new and untreated surfaces as well as old surfaces previously painted. It stresses the need of thorough preparation and the use of the right type of primer if satisfactory results are to be obtained. Part 2.—'Undercoating and Finishing' first shows the method of applying undercoating and finishing paints to various types of surfaces. The correct method of applying paint to walls and ceilings is demonstrated, and also that for painting doors and windows—whether of wood or steel. It emphasizes the necessity of using the right type of

brush for each operation, and shows how to avoid certain hazards when working from scaffolding. The last part of the film deals with the various decorative effects, graining scumbling, texturing, etc., which can be obtained by treating the finishing coat in various ways. The film ends with some hints on the care which should be taken of the equipment, the cleaning and storing of brushes, etc.

Appraisal. This film, originally designed for instructing I.C.I. trainees, was subsequently expanded to cover a wider audience. It is eminently suitable for training personnel in the paint industry and should be of value to architectural students, though it may be too long and detailed for showing to general audiences. The material might have been used to greater advantage in a series of short instructional films. The photography and commentary are of a high standard throughout, but in one or two shots the process can not be seen clearly owing to the position of the operator. A very competent film which explains the various processes clearly and logically. References to æsthetic standards are perhaps out of place in a technical film of this type.
35 sd. 16 sd. 80 minutes. Imperial Chemical Industries, Ltd., Paints Division, Wrexham Road, Slough.

Notes from the Minutes of the Council

MEETING HELD 11 OCTOBER 1949

Appointments

(A) Festival of Britain Working Party on Building Research: R.I.B.A. Representative: Mr. Alister G. MacDonald [*F*].

(B) Ministry of Works Committee on Steel Utilization: R.I.B.A. Representative: Mr. L. W. Elliott [*A*], in place of Mr. M. Hartland Thomas [*F*].

(C) National Housebuilders' Registration Council: R.I.B.A. Representative: Mr. K. J. R. Peacock [*A*] reappointed. *Note.*—The other two representatives serving on this Council are Mr. C. H. James [*F*] and Mr. A. W. Kenyon [*F*].

(D) University College of the South-West, Exeter: R.I.B.A. Representative on Court of Governors: Mr. H. M. R. Drury [*F*], President, Devon and Cornwall Architectural Society.

(E) B.S.I. Committee T.I.B./1/1 "Grading of Timber": R.I.B.A. Representative: Mr. D. W. Aldred [*F*], in place of Mr. P. J. Waldram [*L*]. *Note.*—The second R.I.B.A. representative is Mr. A. H. Barnes [*F*].

Public Works, Roads and Transport Congress Council: The Council accepted an invitation to the Institute to become represented on the Public Works, Roads and Transport Congress Council with which the Public Health Congress Council is being amalgamated.

On completion of the reorganization the Institute will become entitled to appoint two representatives to the Council.

Direct Election to the Fellowship: By a unanimous resolution Mr. Albert James Hazelgrove, F.R.A.I.C., President of the Royal Architectural Institute of Canada, was elected to the Fellowship under the provisions of the Supplemental Charter of 1925, Section IV, Clause 4.

Central Land Board and War Damage Commission: The Secretary was directed to express the Council's regrets at his retirement from the Chairmanship of the Central Land Board and War Damage Commission and their good wishes for his future to Sir Malcolm Trustram Eve. The Secretary was also instructed to convey the Council's greetings and assurances of support and co-operation to Sir Thomas Phillips on his appointment as successor to Sir Malcolm Trustram Eve.

Presentation of Silver Cup: The Council accepted with appreciation the gift of a silver cup from Mr. H. F. Kendall [*Student*].

The cup had been presented in 1847 to Mr. Joseph Kay, Mr. Kendall's great-great-grandfather, by the Architects' Club, and on it was inscribed a number of names of founder members of the R.I.B.A. Mr. Kay had himself been a well-known architect and a member of the Architects' Club. The Secretary was instructed to convey to Mr. H. F. Kendall the Council's thanks for his generous gift.

Sculpture and Mural Decoration in Relation to Architecture: The Secretary reported that the Education Committee of the City of Manchester had approved of the allotment of one-half of 1 per cent of the total cost of future new schools for the purpose of adornment by sculpture and other works of art. The Council's appreciation of his good offices in advocating this step were expressed to Mr. Leonard C. Howitt [*F*], City Architect of Manchester.

Mr. W. M. Dudok (H.C.M. Holland): Celebration of 65th Birthday at Hilversum: A report was submitted from Mr. J. J. P. Oud (H.C.M. Holland), who had, at the President's request, attended the birthday celebrations in honour of Mr. W. M. Dudok at Hilversum on 21 July 1949 as the Institute's representative. The Secretary was instructed to convey the Council's thanks to Mr. Oud for acting on behalf of the Institute.

R.I.B.A. Exhibition 1950: The Council approved the recommendation of the Public Relations Committee that the principal R.I.B.A. Exhibition for 1950 should deal with the subject of Transport.

Town and Country Planning and Housing Committee: The Council approved the recommendation of the newly constituted Town Planning and Housing Committee that their title should be amended to 'Town and Country Planning and Housing Committee' to denote a wider range of planning coming within the purview of the Committee.

Suggested Code of Practice Governing the Practice of Nomination of 'Specialist' Firms to Carry Out Various Branches of Building Work: The Secretary reported that the Joint Tribunal on the Standard Form of Contract had set up a sub-committee under the chairmanship of Mr. Sydney Tatchell [*F*] to examine the present practice of nomination of specialists, to review the principles on which was based the Code of Practice provisionally and informally agreed in 1933 between the R.I.B.A., the Royal Institution of Chartered Surveyors and the National Federation of Building Trades Employers, and to consider any modifications that might be necessary in the light of modern developments. Each of the constituent bodies had been invited to appoint three representatives to serve on the sub-committee.

Mr. J. Alan Slater [*F*], Mr. Charles Woodward [*A*], and Mr. H. T. Seward [*F*] (nominated by the Practice Committee) were appointed as the R.I.B.A. representatives.

York and East Yorkshire Architectural Society: Formation of Hull Chapter: Approval was formally given to the formation of the Hull Chapter of the York and East Yorkshire Architectural Society.

Reception 1950: The Council approved a recommendation that a reception be held at the Institute in 1950.

Defence Regulation 56A: The Council considered a letter from the Minister of Works in which it was explained that after a full discussion of the defences open to an architect charged under paragraph 6 (*a*) or paragraph 8, the Minister was of the opinion that in view of the method in which the regulation was administered no hardship did in fact occur. In the event, however, of the regulation having to come up for amendment on other grounds the Minister promised to bear the point in mind.

It was considered that the safeguards were sufficient, and it was agreed to accept the Minister's assurance of review of the matter if and when the appropriate opportunity arose.

Ministry of Health: Sub-Committee on Revision of the Housing Manual: The Secretary reported that Mr. A. W. Kenyon, Vice-President, acting on behalf of the President during the recess, had approved a memorandum of evidence prepared by the Officers of the Town Planning and Housing Committee in answer to a questionnaire submitted by the sub-committee of the Ministry of Health Central Housing Advisory Committee concerned with the revision of the Housing Manual. The questionnaire was concerned chiefly with advice to Local Authorities on Housing provision for special groups in the community. As desired by the Council, the opportunity had been taken by the Committee to press again for the general adoption of 7 ft. 6 in. as the minimum permissible height of ceilings.

It was agreed to approve the action taken.

Ministry of Works Building Research Programme. A report from the Architectural Science Board Study Group No. 2—Technical, was considered. The report contained comments and suggestions in connection with the draft programme of research prepared by the Programming Committee of the Ministry of Works Advisory Council on Building Research and Development. The draft programme had been submitted to the Institute for comment in the form of a draft survey of the scope of building research and a draft survey of current work in building research.

The Council considered the proposed programme to be of a comprehensive nature, and that only the relatively minor comments suggested by the Study Group need be made. It was accordingly agreed to forward the Study Group's report to the Ministry of Works Programme Committee.

Membership: The following members were elected: as Fellows, 10; as Associates, 54; as Licentiates, 14. Students: 347 Probationers were elected as Students.

Applications for Reinstatement: The following applications were approved: as Fellow, William D'Arcy Cathcart [*A*]; as Associates, Ieuan Gwynn Thomas, Jack Scott Thompson; as Licentiates, Robert Stephen Cowper, Edwin Bickford Tregoning.

Resignations: The following resignations were accepted with regret: Joseph Perkins [*F*], Allen Foxley [*Ret. F*], Wilfrid Davis Lougher-Goodey [*A*], John Begg Campbell [*L*], Arthur Lewis Dyson [*L*], Major John Cyril Thompson [*L*].

Applications for Transfer to Retired Members' Class under Bye-law 15: The following applications were approved: as Retired Fellows, Thomas Simons Attlee, George Arthur

Mitchell; as Retired Licentiates, Philip Nicoll Brundell, Frank Nicolls.

Obituary: The Secretary reported with regret the death of the following members: The Rt. Hon. The Viscount Charlemont [*Hon. A*]; Arthur Pillans Laurie, M.A.Cantab., D.Sc.Edin., F.R.S.E., Hon. R.S.A. [*Hon. A*]. Professor Laurie was Principal of the Heriot-Watt College, Edinburgh from 1900 to 1928, and Professor of Chemistry to the Royal Academy of Arts, London. Charles William Baker [*F*]; Walter Richmond Butler [*F*]; Peter George Jeffery Carter [*F*]; Sidney Colston Garrett [*F*]; Cyril Hawthorn Mitchell [*F*]; U. Hla Thwin [*F*]; Josiah Auty [*Ret. F*]; Richard Croft James [*Ret. F*]. Mr. James was a past President of the Bristol Society of Architects, and represented that Society on the Allied Societies' Conference in 1924/25. William Alfred Pite [*Ret. F*]. Mr. Pite was Pugin Student, 1883. He was a member of the Council from 1906 to 1909, a member of the Literature Standing Committee from 1898 to 1906, the Science Standing Committee from 1922 to 1925, the Board of Examiners (Architecture) from 1900 to 1910, the Competitions Committee from 1906 to 1925, and of the R.I.B.A. Exhibition Joint Committee from 1922 to 1925. Alec Smithers [*Ret. F*]; Herbert Hardy Wigglesworth, Knight of the Royal Order of Vasa [*Ret. F*]; Cecil Barber [*A*]; Henry Cayley [*A*]; David John Chisholm, M.C. [*A*]; Howard George Ingall [*A*]; Edward Tindal Elwin Nash [*A*]; Kenmuir Harry Read [*A*]. Mr. Read was Saxon Snell Prizeman 1930. Joseph Thorneycroft Shelton [*A*]; Kenneth Arthur Spare [*A*]; Charles John Thomas Dadd [*L*]; Robert Henry Fletcher [*L*]; Thomas John Fox [*L*]; Capt. George Melville McCorquodale [*L*]. Capt. McCorquodale served on the Allied Societies' Conference as the representative of the Bucks Society of Architects from 1944 to 1946 and 1947-48. Henry Frederick Mence [*L*]; Wilfrid Rowland Mosley [*L*]; Leonard Charles Webb [*L*]; Thomas Wainwright [*L*]; William Henry Wilkinson [*L*]; Henry Charles William Blyth [*Ret. L*]; James Thomson [*Ret. L*].

In addition, the Secretary reported with regret the death of William Ernest Wanmer, a member of the clerical staff of the Institute.

Members' Column

This column is reserved for notices of changes of address, partnership and partnerships vacant, or wanted, practices for sale or wanted, office accommodation, and personal notices other than of posts wanted as salaried assistants for which the Institute's Employment Register is maintained.

CORRECTIONS TO R.I.B.A. KALENDAR 1949-50

In the list of Students printed in the new issue of the Kalendar the following name was omitted in error: 1949 **Shirbon: William Arthur,** Kensington Gardens, Howden, Goole, Yorkshire.

A misprint occurs on page 423, where the surname **McMonan** should read **McMenan.**

APPOINTMENTS

Mr. N. S. Bean [*A*] is taking up an appointment in the Public Works Department, Kenya, and leaves the U.K. about 17 November. The position is that of Assistant Architect.

Mr. D. L. Thomas [*A*], formerly Planning Officer (Plans) to the Cambridgeshire County Council, has now taken up his appointment as Lecturer in the Department of Town and Country Planning of the University of Durham. He will be pleased to receive trade catalogues etc. at 6 Eslington Terrace, Jesmond, Newcastle-on-Tyne, 2.

PRACTICES AND PARTNERSHIPS

Mr. A. S. Blair [*L*] has acquired the practice of **Messrs. Appleton and Bruce** [*F*], of 22 Victoria Parade, Torquay, and will continue the practice under the same name.

Mr. John Breakwell [*A*] has opened an office at 7 La Motte Street, St. Helier, Jersey, C.I. (Central 514), and will be pleased to receive trade catalogues etc.

Mr. J. C. C. Bruce [*F*], until recently practising under the name of **Appleton and Bruce,** has opened an office at 1 Fore Street, Northam, North Devon, where he will be pleased to receive trade catalogues etc.

Mr. R. H. Bulmer [*A*] has entered into partnership with **Mr. J. Ricardo Pearce** [*A*]. They will practise as **Harold Bulmer and J. Ricardo Pearce,** 93 Cheyne Walk, Chelsea, London, S.W.10 (FLAxman 4966), and will be pleased to receive trade catalogues etc.

Mr. Edgar Bunce [*F*], of 25 Sea Road, Bexhill-on-Sea, Sussex, has taken into partnership **Mr. Lionel Sidney Rider** [*A*]. The practice will be carried on under the name of **Bunce and Rider.**

Mr. Basil C. Deacon [*F*], of **Deacon and Gude,** 9 St. Paul's Square, Bedford, and 85 George Street, Luton, has taken into partnership **Mr. Anthony R. Laing** [*A*]. The firm will in future practise as **Deacon and Laing.**

Maxwell Fry and Jane Drew [*F/F*] have taken the following members of their staff into Junior Partnership: **J. D. Cordwell** [*A*], **K. M. Greenwell** [*A*], **J. B. Shaw** [*A*], and **N. Starrett** [*A*]. The firm will continue to be known as **Maxwell Fry and Jane Drew,** 63 Gloucester Place, London, W.1.

Mr. J. W. C. Miller, B.Sc. [*A*], has opened an office for E. May, Architect and Town Planner, at P.O. Private Bag, Kampala, Uganda, and will be pleased to receive trade catalogues etc.

The partnership between **Messrs. Verner Rees and Hugh Crallan** has been dissolved. **Mr. Verner O. Rees** [*F*], who has been joined in partnership by **Mr. E. P. Wilson** [*A*] and **Miss B. M. Beatty** [*A*], continues in practice at 51 Queen Caroline Street, London, W.6, and **Mr. Hugh P. Crallan,** M.A. [*A*] has opened an office at 42 Manchester Street, London, W.1 (WELbeck 2286).

Messrs. A. F. Scott and Sons [*F/F*], 23 Tombland, Norwich, have taken into partnership **Mr. P. J. Arnold** [*A*], **Mr. K. A. Brewster** [*A*] and **Mr. A. L. Cobb.** The name of the firm will remain unchanged.

CHANGES OF ADDRESS

Mr. Geoffrey J. Monro, B.Sc. [*A*], who practises as **James M. Monro and Son,** has removed from 11 Old Queen Street, London, S.W.1, to 6 Spring Gardens, Cockspur Street, London, S.W.1.

Mr. E. Donald Haigh, A.M.T.P.I. [*A*], has moved his office from Finkle Street, Kendal, to Lowther House, Lowther Street, Kendal, and will be pleased to receive trade catalogues, samples etc.

Mr. F. J. Searley [*F*] has removed to 65 Charlton Road, Shepperton-on-Thames, Middlesex.

Mr. H. P. H. Shepherd [*A*] has removed from 575 Upper Richmond Road, Richmond, Surrey, to 'Salcombe,' 10 Riversdale Road, Thames Ditton.

Mr. C. R. M. Wood [*A*] has removed from 142 Royal Avenue, Belfast, to 40 Victoria Square, Belfast, to which address all future communications or trade catalogues should be sent. (Mr. Wood is Assistant Honorary Secretary of the Royal Society of Ulster Architects.) This change of address was erroneously attributed to **Mr. Albert Neill** [*A*], Honorary Secretary of the Royal Society of Ulster Architects, on page 548 of the October JOURNAL.

Mr. D. E. Wright, O.B.E. [*L*], has removed to 'Lulworth,' Beatty Avenue, Roath Park, Cardiff.

PRACTICES AND PARTNERSHIPS WANTED AND AVAILABLE

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